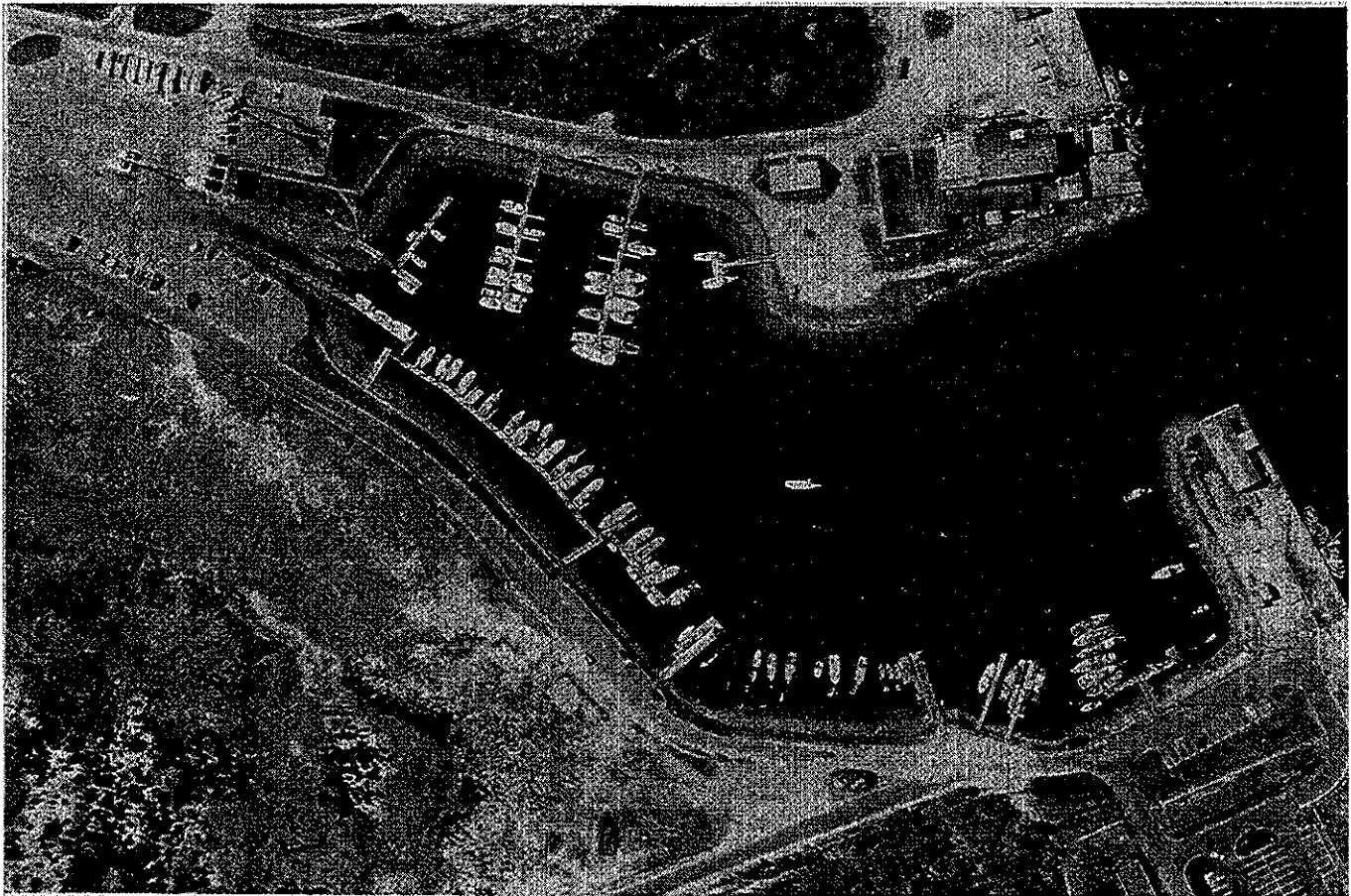

Feasibility Report and Environmental Assessment
For Navigation Improvements

DRAFT

East Boat Basin Cape Cod Canal Sandwich, Massachusetts



**US Army Corps
of Engineers**
New England Division

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

Department of the Army
New England Division, Corps of Engineers
Waltham, Massachusetts
December 1983

SYLLABUS

This study investigated the navigational needs at the East Boat Basin, Cape Cod Canal, Sandwich, Massachusetts to determine the advisability of providing navigation improvements for commercial fishing and recreational boating.

Since the acquisition and widening of the Cape Cod Canal by the U.S. Army, Corps of Engineers in the late 1930's, the commercial fishing and recreational boating activities have steadily increased such that present facilities are inadequate. The existing basin becomes congested during the summer due to an influx of recreational boats, and the demand from commercial fishing vessels cannot be satisfied because of limited space and depth. Construction of an expanded basin would provide the necessary harbor area to accommodate the continuing demand that has grown because of the East Boat Basin's ideal location.

Local interests envision the development of a full service harbor in conjunction with a basin expansion project. In addition to the increase in berthing area that would be provided by the navigation project for recreational and commercial boats, upland development planned by local interests would include fish processing facilities (offloading, packing, freezing), rack storage of small recreational boats, marine supply and repair facilities, and possible restaurants and other recreation related businesses. The potential exists for the East Boat Basin to become a major regional port, through implementation of modern efficient facilities.

Several alternatives, similar in concept, were analyzed in an attempt to find the improvement plan that best addresses the needs of commercial fishing and recreational boating activities. The results of the analyses indicated that the most economically feasible plan of improvement would provide a basin expansion of about 12 acres, consisting of 9.9 acres of water area and 2.1 acres of riprap slope protection. The expansion would include berthing areas of about 4.5 acres and 1.8 acres, for commercial vessels and recreational boats, respectively. The project would provide a 14-foot deep access channel 120 feet wide for a length of about 1220 feet from the basin entrance into the expansion, and a 450-foot by 160-foot turning/maneuvering area 14 feet deep. In addition to berthing areas, local interests would construct offloading areas and bulkheading for fish offloading and other activities.

The selected plan would generate approximately \$3,976,000 in annual benefits based on increased fish landings and increased value of recreation use. The estimated first cost for the navigation project would be \$7,746,000, and the total estimated investment cost would be \$10,447,000. The total annual cost would be \$884,000, which includes maintenance charges and economic costs for slips, land value and interest during construction. The selected plan was shown to be economically feasible with a benefit-cost ratio of 4.5 to 1.

Construction time for the project is estimated at 2 years. The expansion project would involve the removal of about 534,470 cubic yards of material, the bulk of which would be upland material. Material would be transported by scow to the Foul Area in Massachusetts Bay for disposal.

The Division Engineer recommends the implementation of a Federal navigation project, in accordance with the selected plan. The recommendation is made with the provision that non-Federal interests meet certain requirements as outlined in the report. Financing of the Federal project will be in accordance with financial arrangements that are determined to be acceptable to the Administration, the Congress and local interests.

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

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EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

INTRODUCTION

The East Boat Basin is a small harbor located in Sandwich, Massachusetts, approximately 50 miles southeast of Boston. It is situated along the south bank of the Cape Cod Canal, about 3,000 feet inside the eastern end. The Cape Cod Canal is owned and operated by the U.S. Army Corps of Engineers, and provides a waterway connecting Buzzards Bay to the southwest with Cape Cod Bay to the northeast. Figure 1 shows the location of the East Boat Basin.

Over the years the East Boat Basin has developed into a very active harbor. The two major navigation-related activities occurring at the basin include commercial fishing and recreational boating. Sandwich is one of the largest fishing ports in Massachusetts, in terms of pounds of fish landed. There is also a sizeable recreational marina that provides berths for pleasure craft and a launching ramp for trailered boats.

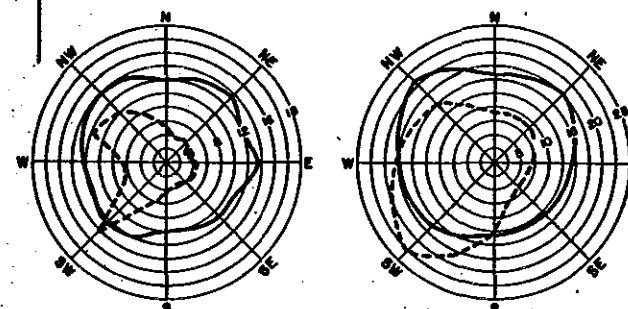
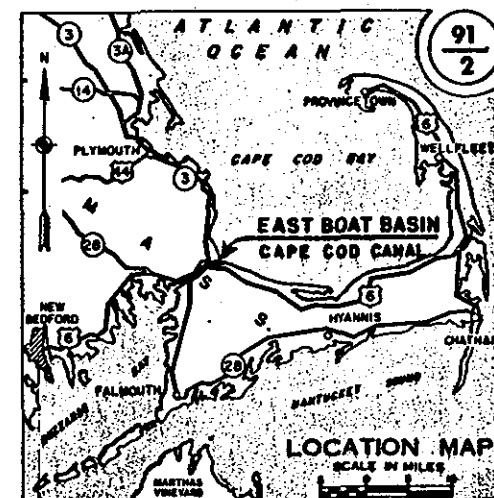
The growth of both activities has greatly increased demand for use of the harbor, and very crowded conditions now exist. Local interests have recognized the potential opportunities presented by the possibility of satisfying present and future demand. They have therefore proposed expansion of the East Boat Basin. The local interests anticipate that large local and regional socioeconomic benefits will result from an expansion project, in addition to increasing the national economic output.

As a first step towards expansion of the East Boat Basin, the local interests requested that the Federal Government determine if it would participate in such a project. As a result of that request this study was authorized by a Congressional resolution and subsequently initiated in July 1980.

STUDY AUTHORITY

Authority for conducting the East Boat Basin navigation study was provided by a Congressional resolution. The resolution was adopted by the U.S. House of Representatives Committee on Public Works and Transportation on 9 May 1979. The resolution authorizing the study is quoted verbatim below.

"Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report on the East Boat Basin, Cape Cod Canal, Sandwich, Massachusetts submitted in House Document No. 168, 85th



Based on data compiled from observations
of the U.S. Weather Bureau at Boston
Logan International Airport from 1949 to 1953

Based on data compiled from observations
of the U.S. Weather Bureau at Stock Island,
Rhode Island, from 1921 to 1930

LEGEND

2. Duration —
 60 minutes (N.R.N.)

WIND DIAGRAMS

FOR BOSTON, MASS. AND BLOCK ISLAND, RHODE ISLAND

NAVIGATION STUDY
LOCATION MAP
EAST BOAT BASIN
CAPE COD CANAL, MASS.

30 SEPTEMBER 1970

IN 2 SHEETS SHEET 2
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

FIGURE 1

Congress, 1st Session, and prior reports with a view to determining the advisability of modifying the existing project at this time, particularly for the benefit of the existing and prospective commercial fishing and recreational boat fleets."

STUDY AREA

The geographical scope of the study was primarily limited to the East Boat Basin and the immediate area around it, including the land area to be utilized for the proposed basin expansion, and the bulkhead area along the Cape Cod Canal. Basin expansion planning was limited to the aforementioned land area since expansion beyond its limits would disrupt existing development, and local interests preferred that planning be focussed on this area. The area along the canal bulkhead was also included because activities there are interrelated with basin activities.

The study area was also considered from a broader perspective. Base conditions were established for the local Sandwich area and regionally for Barnstable County. Navigation activities occurring in the entire Cape Cod region were considered since navigation improvements at the East Boat Basin will affect the region. Disposal of dredged and excavated material will also impact areas outside the immediate study area.

STUDY OBJECTIVE AND SCOPE

This comprehensive water resources improvement study was performed to determine the cost and economic feasibility of expanding the East Boat Basin. This feasibility report is the end product of the study and presents study findings, including economic feasibility, environmental impacts, project costs, level of Federal participation and recommendations concerning project implementation. This document is the final response to the study authority, and will be utilized by the Federal Government as a decision-making tool to assist it in making a final determination concerning Federal involvement in an expansion project at the East Boat Basin.

The study scope of work involved an iterative planning process that addressed four major activities to various degrees throughout the study. The activities are delineated below.

1. Problem Identification - A wide range of available information and public views were gathered, from which the base conditions were established. Analysis of the base conditions identified the navigation problems, needs and opportunities of the study area.
2. Formulation of Alternatives - A range of alternative plans was developed to address the identified navigation problems and needs, and to promote potential opportunities.

3. Impact Assessment - Potential impacts that would result from implementation of alternative plans were determined, including economic, environmental, socioeconomic and engineering impacts.
4. Evaluation - Evaluation criteria were established based on the types of impacts. Alternative plans were comparatively evaluated in order to identify the most implementable plans.

Initial iterations of the planning process focussed primarily on problem identification, while latter iterations were more concerned with formulation, impact assessment and evaluation of alternative plans. A graphical representation of the planning process is shown on Figure 2. The final outcome of the study was the selection of a most desirable plan, and a recommendation to implement navigation improvements that are economically feasible, socially beneficial and environmentally acceptable.

PRIOR REPORTS

A number of reports have been prepared over the last 50 years for various proposed navigation projects in the Cape Cod Canal area. The earlier reports discussed briefly the East Boat Basin in conjunction with the main Cape Cod Canal project. Several reports, however, have been prepared that specifically address the East Boat Basin, and therefore it is appropriate to identify them.

<u>Report</u>	<u>Subject of Report</u>	<u>Recommendation</u>
Survey, review of reports, unpublished, submitted to Congress, 23 January 1940.	Enlargement of the East Boat Basin.	Unfavorable.
Survey, review of reports, of East Boat Basin, Cape Cod Canal, Massachusetts NED, 29 June 1956.	Expansion of the East Boat Basin.	Favorable. Basin expanded to existing size in 1963.
Feasibility Study, East Boat Basin Expansion, Sandwich, Massachusetts, April 1979, Tibbetts Eng. Corp. for the town of Sandwich, Massachusetts.	Expansion of the East Boat Basin.	Favorable.

These reports address proposed or actual modification to the existing East Boat Basin. There was no separate report recommending construction

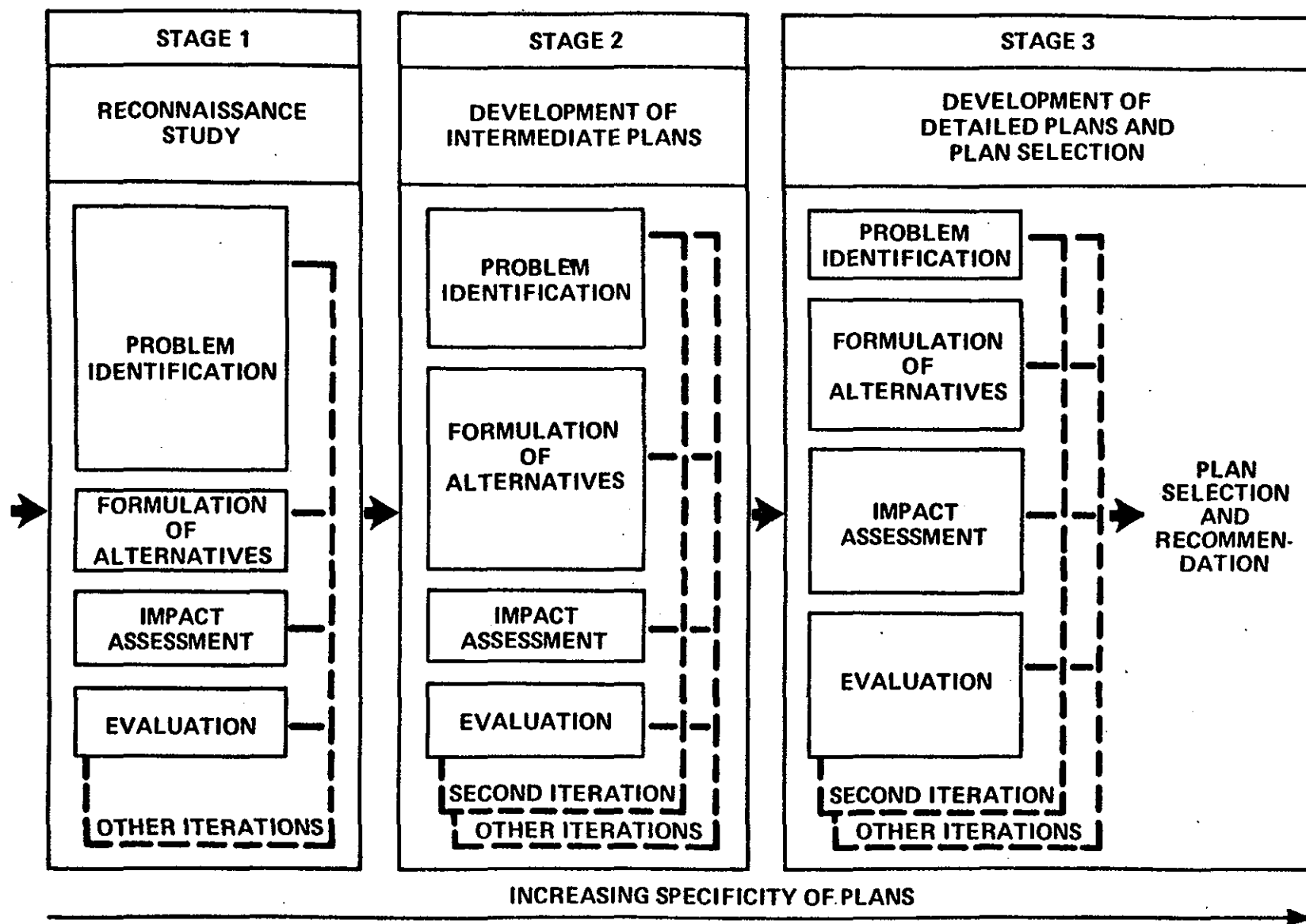


FIGURE 2- GENERAL RELATIONSHIP OF PLAN DEVELOPMENT STAGES AND FUNCTIONAL PLANNING TASKS

of the East Boat Basin, which was authorized under the existing Cape Cod Canal project authority as an accessory or minor feature deemed necessary.

EXISTING PROJECTS

The previously mentioned Cape Cod Canal is the only other navigation project in close proximity to the East Boat Basin. The Cape Cod Canal is an active Federally authorized project, owned and operated by the Corps of Engineers. It consists of a sea level canal, access channels, three bridges, operation and maintenance facilities, and various recreational areas. The canal has a bottom width of 480 feet and a depth of 32 feet at mean low water. The Cape Cod Canal project is shown on Figure 3.

Expansion of the East Boat Basin will not have any major impact on the Cape Cod Canal project. The existing channel width should be able to accommodate the expected increase in small boat traffic. On land, the additional basin activity may increase the use of Corps recreation areas at the East Boat Basin.

EXISTING CONDITIONS

In order to fully understand the problems and to identify potential opportunities of a study area, the existing conditions were examined. Historical trends have been reviewed to help show how present conditions developed. Discussion of regional existing conditions is also included, since implementation of a project at the East Boat Basin would impact the region.

ENVIRONMENT

The environment in proximity to the East Boat Basin is similar to other coastal areas of the lower Cape Cod region. Terrestrially, the area is comprised predominantly of sandy-soiled rolling hills, which are well-forested with largely coniferous trees. The basin is located in the flatter transitional zone extending from the hills to Cape Cod Bay. The area immediately around the basin contains human development, except to the south. This area is presently undeveloped, containing sandy surface materials and various species of trees, bushes and grasses. Its 22 acres have been zoned for marine, industrial and business development by the town of Sandwich.

The basin itself can be characterized as a developed harbor, probably not containing a high level of marine life. The Cape Cod Canal provides a continuous source of good quality water that helps maintain an acceptable water quality level in the basin.

Environmental conditions of the area are discussed in more detail in the Environmental Assessment, located after the main body. Existing hydrographic and topographic conditions at the East Boat Basin are shown on Figure 4.

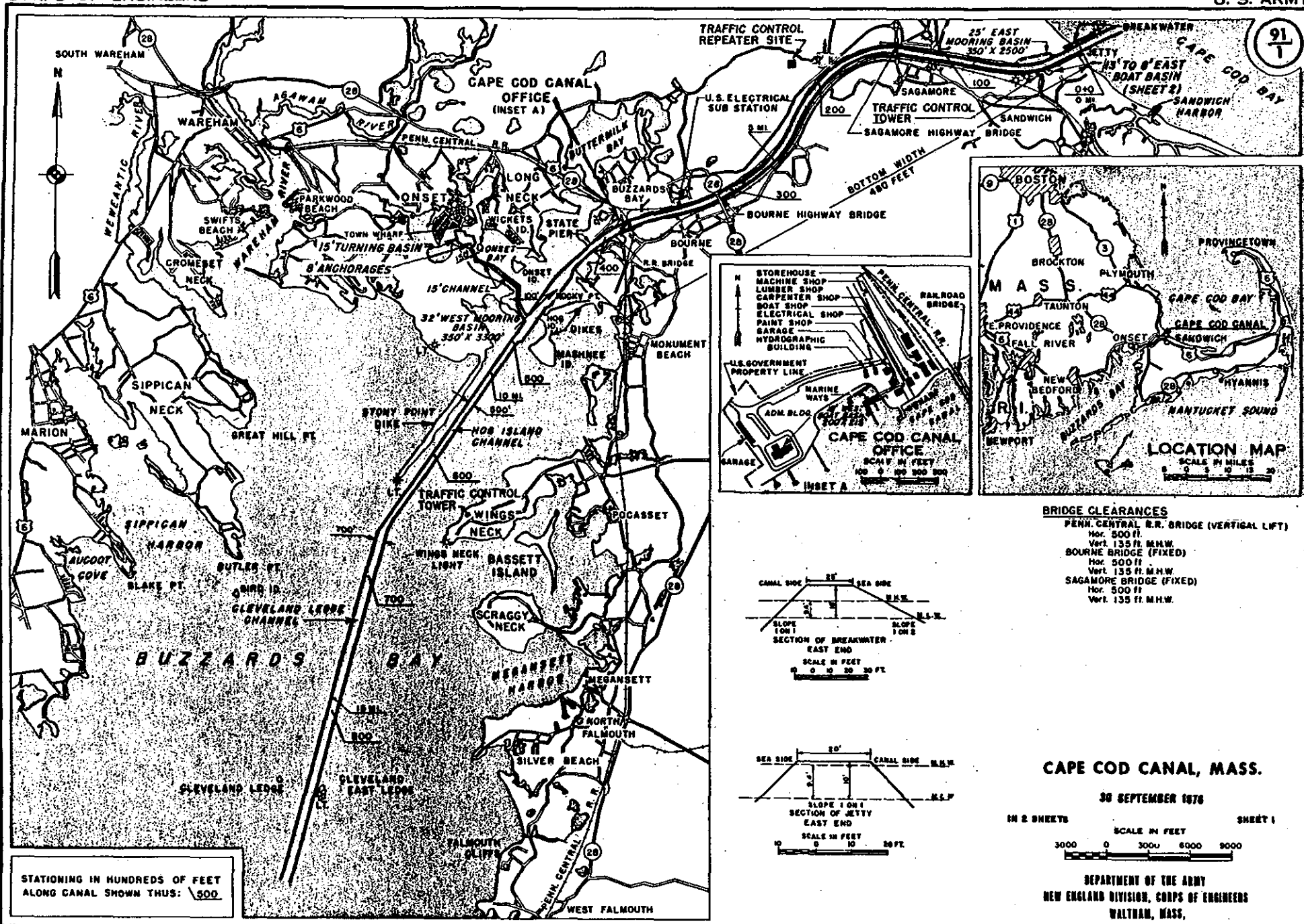


FIGURE 3

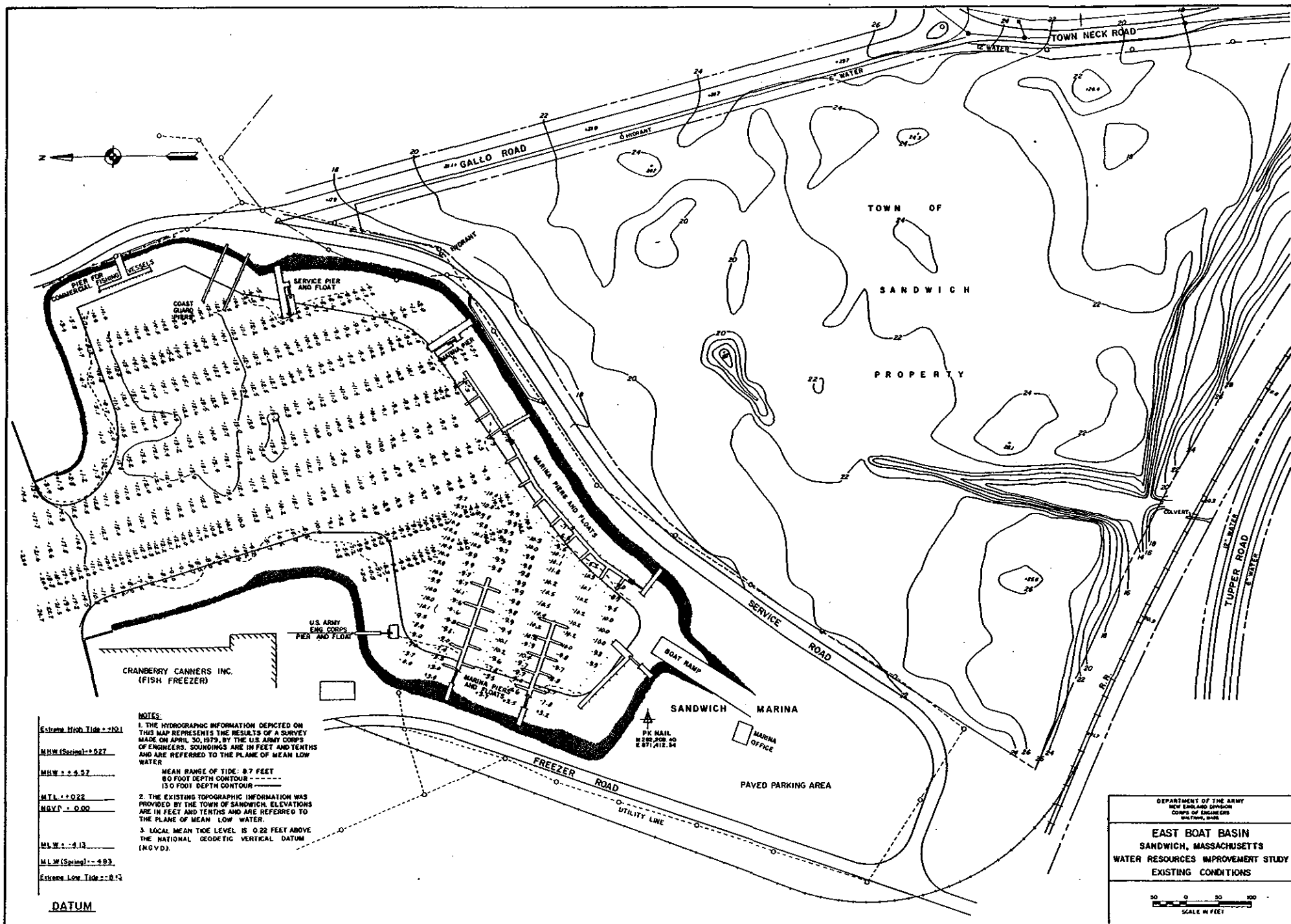


FIGURE 4

HUMAN RESOURCES AND ECONOMIC DEVELOPMENT

Population

The population of Sandwich has grown at a rapid rate, far in excess of the growth rate experienced in Massachusetts, New England and the United States. Between 1950 and 1980 the town's population increased from 2,418 to 8,727, 261 percent. The rapid growth trend witnessed in Sandwich is also evident in Barnstable County. From 1950 to 1980, Barnstable County grew from 46,805 to 147,925 showing a 216 percent increase. During the same period, the state population increased by only 22 percent. Population growth trends for Sandwich, Barnstable County and the Commonwealth of Massachusetts are presented in Table 1.

Population figures for Cape Cod can be deceiving if the significant seasonal fluctuations consistent with a summer resort area are not taken into consideration. Population in Sandwich and Barnstable County begins to grow gradually in April, peaks in July and August, and declines to its year-round population level in early November. Peak seasonal population in Sandwich more than doubles the year-round population, with Barnstable County more than quadrupling its year-round population.

Table 1

Population Growth Trends (Year Round Population)

	<u>Sandwich</u>	<u>Percent</u> <u>Change</u>	<u>Barnstable</u> <u>County</u>	<u>Percent</u> <u>Change</u>	<u>Massachusetts</u>	<u>Percent</u> <u>Change</u>
1950	2,418		46,805		4,690,514	
1960	2,082	-13.9	70,286	50.1	5,148,578	9.7
1970	5,239	151.6	96,656	37.5	5,689,170	10.4
1980	8,727	66.6	147,925	53.0	5,737,037	.8

Another characteristic of the population of Sandwich and Barnstable County is the increasing percentage of residents 65 years of age and over. Between 1970 and 1980, Sandwich's 65 and over population grew from 577 to 1,249, an increase of 117 percent. For Barnstable County the 1970 to 1980 increase was 88 percent. These figures compare to a 15 percent increase statewide for the same age category. The proportion of the population over 65 is greater in the county than either Sandwich or the Commonwealth. Table 2 provides the relevant data.

Table 2

Population Aged 65 and Over, 1970-1980

	<u>1970</u>	<u>1980</u>	<u>Percent Change</u>	<u>Percent of Total Population</u>
Sandwich	577	1,249	116.5	14.3
Barnstable County	16,348	30,725	87.9	20.8
Massachusetts	633,383	726,531	14.7	12.7

Source: Cape Cod Planning and Economic Development Commission

Industry

The economic structures of the town of Sandwich and Barnstable County share a common characteristic: they are tourist-dependent economies with a seasonal peak in activity during July and August. Those employment sectors related to tourism, such as wholesale and retail trade and services, are the two largest employers in both the town and county, and continue to grow both year-round and seasonally. The wholesale and retail trade sector includes any food or clothing stores, department, chain, or discount stores, novelty shops, antique shops, gift shops, gas stations and sales outlets for recreational equipment. The service sector includes motels, hotels, and lodgings of all types, restaurants, health care institutions, recreational and entertainment facilities, fire and police departments and all trades.

Between 1970 and 1980 the total annual average employment in Sandwich rose from 497 to 1,719, an increase of 245.9 percent. Contributing to that total increase was a combined growth in the wholesale and retail trade sector and the services sector of 144.3 percent. Employment figures for these sectors are presented in Table 3. The dependence of Cape Cod's economy on these sectors is further illustrated by the fact that in 1980, they combined to provide 54 percent of all employment offerings in the town of Sandwich.

Table 3

Employment by Industry - Sandwich

	<u>1970</u>	<u>1980</u>	<u>Percent Change 1970-1980</u>
Total Employment	497	1,719	245.9
Agri., Forestry, Fishing	19	13	-31.6
Mining	0	0	0
Contract Construction	68	84	23.5
Manufacturing	14	19	35.7
Tran., Comm., Utilities	4	151	3,675.0
Wholesale/Retail	221	540	144.3
Finance, Insurance & Real Estate	49	123	151.0
Services	121	396	227.3
Government		393	-

Source: Massachusetts Division of Employment Security

Other major employment sectors in Sandwich and Barnstable County are the transportation, communication, and utilities sector; construction; services; government and finance, insurance, and real estate. Employment in these sectors is also subject to seasonal fluctuations with peaks occurring in different months of each year.

Labor Force

Unemployment is a major problem facing the labor force in both Sandwich and Barnstable County. In 1981, 14.3 percent of approximately 3,151 members of the town's labor force were unemployed while 9.2 percent of the 73,022 members of the county's labor force were unemployed. The severity of the problem is obvious when a comparison is made with the statewide 1981 unemployment rate of 6.4 percent. In general, unemployment trends in Sandwich and Barnstable County have corresponded with the pattern of increase and decline of state and national unemployment trends, but at a significantly higher level of unemployment. Average annual employment data is provided in Table 4.

Table 4

Average Annual Employment, 1981
Sandwich, Barnstable County, and Massachusetts

	<u>Sandwich</u>	<u>Barnstable County</u>	<u>Massachusetts</u>
Labor Force	3,151	73,022	2,961,000
Employed	2,701	66,297	2,773,000
Unemployed	450	6,725	188,000
Unemployment Rate	14.3	9.2	6.4

Seasonal fluctuations in the Cape Cod economy intensify the problem, usually causing unemployment to soar in the off-season for tourism. In most years, the seasonal unemployment low point occurs in July or August, even though the labor force is greatly expanded. In 1981 the seasonal low point occurred in July in Sandwich at 8.9 percent unemployed. In Barnstable County, in 1981, unemployment hit its low of 5.7 percent in both May and June. The high points in unemployment occurred in January for both Sandwich and Barnstable County at 27.5 percent and 13.9 percent respectively. These unemployment rates are high in comparison to the statewide rate of 6.4 percent in January. The relevant data is presented in Table 5.

Table 5

1981 Unemployment Rate
Sandwich, Barnstable County, Massachusetts

	<u>Sandwich</u>	<u>Barnstable County</u>	<u>Massachusetts</u>
January	27.5	13.9	6.4
February	20.2	13.1	6.4
March	18.7	12.1	6.2
April	12.9	8.1	5.2
May	11.0	5.7	5.7
June	9.6	5.9	6.4
July	8.9	5.7	6.7
August	11.8	7.6	7.2
September	10.4	6.5	6.5
October	14.0	8.9	7.0
November	16.3	10.4	6.4
December	18.0	11.6	6.9
Average	14.9	9.1	6.4

Housing

The 1980 Census indicated that 91.8 percent of year-round housing units in Sandwich were single family structures. Six point one percent were structures with 2 to 9 units and about 2 percent of the structures house 10 or more families. From a total of 4,358 housing units, 3,116 are counted as year-round housing units by the planning commission. Although the census indicates a higher figure, the planning commission's number reflects those units that are actually used as year-round units and does not include those that could be used, but are not. Therefore, there are 1,242 housing units used on a seasonal basis. Table 6 shows the pertinent data.

Table 6

Housing Types Sandwich, Massachusetts 1980

<u>Units</u>	<u>Number</u>	<u>Percent Total</u>
1	3,280	91.8
2-9	219	6.1
10 or more	70	2.0
Mobile Home/Trailer	3	.1
Total (Year-round units)	3,572	100.0

Source: U.S. Census

The Cape Cod Planning and Economic Development Commission shows that the number of housing units has been increasing since 1970. From 1970 to 1980, there was a 84 percent increase in the number of housing units. A majority of the increase occurred in the construction of year-round housing units as opposed to seasonal units. This trend is expected to continue as more people permanently reside in Sandwich. Housing trends for the county and town are shown in Table 7.

Table 7

Housing Units Sandwich, Massachusetts

	<u>1970</u>	<u>1980</u>	<u>Percent Increase</u>
Sandwich	2,368	4,358	84.0
County	65,676	99,946	52.2

Land Use

The largest portions of Sandwich and Barnstable County remain in an undeveloped natural wilderness state, a fact that accounts for much of the region's attractiveness as a vacation resort area. As Table 8 illustrates, forests and wetlands cover approximately 74 percent of Sandwich's surface area and 72 percent of Barnstable County's. Of the developed land, the largest share is devoted to residential use: 10 percent in Sandwich and 14 percent in Barnstable County. All other urban land uses including commercial, industrial, transportation, and public institutional account for a very small portion of the land area throughout Cape Cod. Agriculture and open space cover about 7 percent of Sandwich's land area and 8 percent of the county's. It is important to note that 9,416 acres in Sandwich or 33 percent of the land is controlled by the Federal Government at Camp Edwards and Otis Air Force Base.

Table 8

Land Use, 1972 Sandwich and Barnstable County

	<u>Sandwich</u>		<u>Barnstable County</u>	
	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	<u>Percent</u>
Urban Land*	4,431	15.5	48,869	17.2
Residential	2,761	(9.7)	39,986	(14.1)
Transportation	311	(1.1)	2,801	(1.0)
Commercial	54	(.1)	2,287	(.8)
Industrial	81	(.3)	489	(.2)
Open and Public	1,224	(4.3)	3,356	(1.2)
Mining, Waste Disposal	199	0.6	1,659	0.6
Agriculture, Open Land	2,063	7.2	22,848	8.1
Outdoor Recreation	684	2.4	6,255	2.2
Wetland	2,282	8.0	47,841	16.9
Forest Land	18,824	66.0	156,097	55.0
Total	28,484	100.0	238,569	100.0

*The indented items sum, providing the total under Urban Land.

Source: Cape Cod Planning and Economic Development Commission

Because such a large percentage of the region remains undeveloped, and there are projections for accelerated growth of year-round and summer populations, rapid changes in patterns of land use are possible. In fact, in the past 10 to 15 years there has been a sizeable increase in residential development. It has been higher recently than in the past, primarily in residential single family homes. However, Sandwich's development is hindered by environmental considerations, lack of a large year-round population to support development and lack of adequate waste disposal sites.

EAST BOAT BASIN AND RELATED ACTIVITIES

Historic Development of the Basin

The history of the East Boat Basin begins with the project that enlarged the Cape Cod Canal, which had originally been constructed by private interests as an aid to navigation. It became an uneconomical investment and was purchased by the Federal Government in 1928 for \$11,500,000. The as-bought canal was deemed inadequate for safe use by the increasingly larger deep draft vessels using it, so the Federal Government proposed widening it. The canal was widened to a bottom width of 480 feet and deepened to 32 feet at mean low water. Construction of the widening project was performed between 1935 and 1940 at a cost of \$19,925,550. Included in this construction was the East Boat Basin.

The basin was constructed to provide facilities for maintenance and repair of floating plant in connection with the operation of the canal. The basin, as originally dredged, was approximately 150 feet square at a depth of 10 feet below mean low water. A bulkhead, which is not specifically mentioned in the House Document recommending widening of the canal, was constructed in 1937 as a minor feature deemed necessary. The bulkhead construction cost was \$140,928.84. It is located along the Cape Cod Canal on both sides of the entrance to the East Boat Basin and is still in place with minor additions and repairs made to it over the years. No bulkhead has ever been constructed within the basin. The basin was subsequently enlarged to serve as a harbor of refuge for small boats during north-easterly storms.

The enlarged basin is shown in Figure 5. It was about 2.7 acres in area with a project depth of 13 feet below mean low water. Commercial use of the bulkhead began shortly after its construction. The Canal Fish & Freezing Company (now Canal Marine, Inc.) began to offload fish on the west side of the basin entrance. In 1937 an easement for laying of pipelines between the bulkhead and a tank farm was granted by the Corps for the purpose of offloading petroleum products. Subsequent commercial usage of the bulkhead increased from 1952 to 1956 when three additional fish packing businesses obtained leases, causing many fishermen to realize the convenience of permanently operating out of the basin. During 1954 the fishing fleet using the basin consisted of about 7 vessels in the winter and 25 vessels in the summer. Typical fishing vessels of the period were 40-60 feet long with drafts of 6-8 feet.

A sizeable number of recreational craft also utilized the basin on a regular basis. Many transient boats found the basin a convenient stopover point. The increased usage prompted local interests to desire an enlarged boat basin that would provide a more adequate harbor of refuge.

In 1963 the basin was again enlarged to present dimensions at a cost of \$245,700. An area of 4.3 acres was added to the existing 2.7 acres for

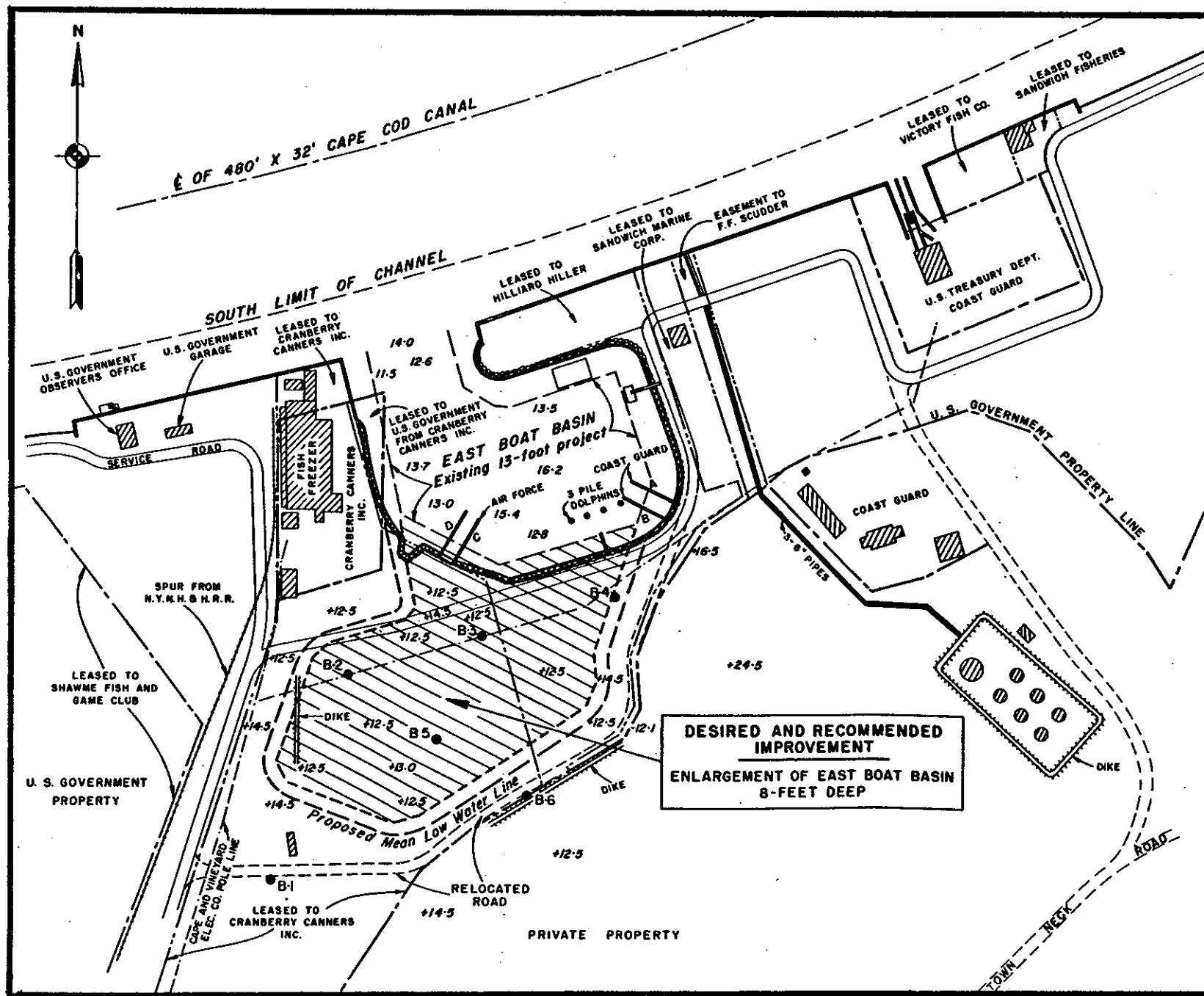


FIGURE 5 EAST BOAT BASIN PRIOR TO 1962 EXPANSION

a total of about 7 acres. The project depth for the new portion was 8 feet below mean low water. The perimeter of the basin consists of riprap revetment with slopes ranging from 1 vertical : 2 horizontal to 1 vertical : 4 horizontal. Local interests were required to provide a suitable public marina, and a boat launching ramp for trailered boats. These are the physical conditions of the East Boat Basin as it exists today.

The Commercial Fishing Industry at Sandwich

The commercial fishing industry began at the East Boat Basin shortly after completion of the canal bulkhead when the Canal Fish & Freezing Co. was established. The largest growth of the industry occurred between 1952 and 1956 when the Victory Fish Co., Cape Cod Shellfish Co. and the Clearwater Fish Co. were established. This brought the total number of fish offloading businesses to four, including the Canal Fish & Freezing Co.. These businesses have subsequently changed hands many times, but the total number of businesses and their locations have remained the same since 1956. Available records indicate that 7,200 tons (14.4 million pounds) of fish valued at \$700,000 were landed at Sandwich in 1955. An additional 300,000 pounds of shellfish valued at \$100,000 were also landed there, for totals of 14.7 million pounds and \$800,000.

The commercial fishing industry at the East Boat Basin is composed of three distinct parts, the offloading businesses, the local fishing fleet and the transient fishing fleet. The characteristics of each segment are discussed in order to obtain a feel for the unique situation that exists.

The offloading businesses are discussed first since it appears that they provided the original stimulus for development of the fishing industry at the East Boat Basin.

Canal Marine, Inc. - Canal Marine, Inc. is located on the west side of the entrance to the basin. This facility was the first one established for fish offloading back in 1937. Canal Marine owns the land it is on, since it was located at that site prior to the canal being widened when the firm was apparently involved in the cranberry industry. A small piece of Canal Marine property is leased to the Corps, where the East Boat Basin cuts through the property. In turn, the Corps leases a bulkhead tract to Canal Marine for the purpose of offloading fishing boats.

Canal Marine is a volume business dealing in non-traditional species. Herring is the primary species, but mackerel, hake and squid are also handled. Fishing boats are offloaded by means of conveyors or pumping. The fish can be directly loaded into trucks for immediate distribution to processing plants or they can be stored in the 3.5-million pound capacity freezer for distribution. The fish is distributed primarily to overseas markets. Canal Marine contracts with large offshore boats (80'-120') to obtain fish. There are no Sandwich-based boats that deal with Canal Marine, Inc.

Atlantic Coast Fillet Company, Inc. - This firm is located on the east side of the basin entrance on the neck of land between the basin and canal. This business leases its space from the Corps for the purpose of offloading fish.

Atlantic Coast Fillet Co., Inc. is a wholesaler of groundfish and some scallops. Species include yellowtail flounder, blackback flounder, cod and haddock. The fish is boxed on board the fishing boats or at the facility and is then distributed to processors in New Bedford, New York, Pittsburgh and the southern U.S. Atlantic Coast. Atlantic Coast Fillet Co. is the only facility that services the local fleet, which represents somewhat less than 50 percent of its total number of landings.

Joe's Lobster Mart, Inc. - This company is located just to the east of the former Coast Guard Marine railway. It also leases its space from the Corps.

This business deals in live lobster, which are distributed to the regular fish markets and directly to restaurants. About 95 percent of the catch is obtained from large offshore lobster boats (75'-80') and from draggers that have accidentally caught lobsters in their nets. The remaining 5 percent is inshore lobster provided by the Sandwich fishing fleet.

R&D Seafood Emporium, Inc. - R&D Seafood Emporium, Inc. is located about 100 feet east of Joe's Lobster. It also has a lease from the Corps. R&D began operations in August 1980, when it obtained control of the expired lease held by Sandwich Fisheries, Inc.

This distributing business is similar to that of the Atlantic Coast Fillet Co., Inc., except that only larger offshore boats (80'-120') are offloaded. Sandwich-based boats are not offloaded at R&D. R&D also operates a small retail outlet at the same location.

Virtually all landing of fish at the East Boat Basin is performed on the Corps' bulkhead at the four offloading facilities. Small amounts of fish, primarily lobster, are offloaded by small-boat fishermen themselves. Table 9 shows a breakdown of the types of species and amounts of each landed at Sandwich in 1977.

Table 9

Species, Pounds and Value Landed
All Boats
Sandwich, Massachusetts, 1977

<u>Species</u>	<u>Pounds</u>	<u>Value</u>
Yellowtail	2,700,000	\$1,377,000
Sea Scallop	670,000	1,110,000
Blackback	2,276,000	780,000
Cod	1,610,000	466,000
Bluefin Tuna	382,000	414,000
Lobster	278,000	455,000
Sea Herring	5,795,000	201,000
Haddock	541,000	180,000
Fluke	288,000	173,000
Ocean Dab	239,000	79,000
Greysole	134,000	55,000
Sand Dab	229,000	55,000
Monk Tail	149,000	55,000
Squid	77,000	23,000
Pollock	124,000	21,000
Scup	48,000	13,000
Sea Bass	12,000	9,000
Whiting	39,000	4,000
Crab	16,000	4,000
Hake	9,000	2,000
Wolf Fish	21,000	2,000
Halibut	1,000	2,000
Mackerel	6,000	2,000
Cusk	6,000	1,000
Butterfish	3,000	1,000
Other	5,000	1,000
Total	15,658,000	\$5,485,000

Source: An Economic Profile of the Cape and Island Fisheries, Cape Cod Planning and Economic Development Commission, 1978.

Sandwich is the second largest fishing port on Cape Cod in terms of pounds of fish landed. It is the fifth largest in Massachusetts and was listed as the 47th largest in the country in 1980, according to the National Marine Fisheries Service. Table 10 compares Sandwich landings for 1980 to other Massachusetts ports.

Table 10

Fish Landings by Port, 1980

<u>Port</u>	<u>Millions of Pounds</u>	<u>Millions of Dollars</u>
Gloucester	210.0	34.7
New Bedford	99.6	71.3*
Boston	34.4	12.3
Provincetown	25.8	10.4
Sandwich	14.2	7.4

* New Bedford has the largest ex-vessel value of fish landed, since a large percentage of the landings consist of higher priced scallops.

Source: Fisheries of the United States, 1980, National Marine Fisheries Service, April 1981.

Sandwich's ideal location for offloading fish can be evidenced by the quick increase in the amount of fish landed from 1975 to 1978, when the amount leaped from 6,400,000 pounds to 19,000,000 pounds, an increase of 197 percent in 4 years.

A decline in fish landings occurred at Sandwich in 1980, although other major Massachusetts fishing ports increased their amounts of fish landed. Table 11 compares annual fish landings of the five largest ports in Massachusetts.

Table 11

Fish Landings by Port, 1977-1980
Millions of Pounds

<u>Port</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Gloucester	150.9	185.4	160.2	210.0
New Bedford	75.5	71.9	86.0	99.6
Boston	22.2	27.3	30.3	34.4
Provincetown	17.9	19.9	23.4	25.8
Sandwich	15.3*	19.0*	19.1	14.8

Sources: Fisheries of the United States, 1980, National Marine Fisheries Service, April 1981.

Northeast Fisheries Center, Woods Hole, Massachusetts.

National Marine Fisheries Service, Resource Statistics Office, March 1981.

* State of Massachusetts, Division of Marine Fisheries

There are several possible contributing factors which may have caused the recent decline. During the 1978 and 1979 peak period, the offloading facilities might have overreached their capability in handling fish, causing lines of waiting boats. Having experienced this problem, operators of many of the large transient vessels may have decided to switch to a less congested port to offload. Major increases in the price of fuel may have caused the fishing fleet to reduce the number of fishing trips, resulting in decreased landings. Other possible contributing factors include market condition impacts or fluctuation in the amount of seasonal marine resources such as herring, which accounts for about one-third of the total pounds landed. Future landings, however, should reflect Sandwich's potential to become a fully developed fishing port.

The local fishing fleet at Sandwich consists of about 40 boats year-round. Table 12 shows the make-up of the Sandwich fishing fleet in both the summer and winter.

Table 12

Composition of Sandwich-Based Fleet

<u>Type of Boat</u>	<u>Number of Vessels</u>	
	<u>Summer</u>	<u>Winter</u>
Lobster	20	0
Trawler	18	29
Scallop	<u>6</u>	<u>6</u>
Total	44	35

Source: Harbormaster, Sandwich East Boat Basin

The terms summer and winter are used in Table 12 to define the various fishing and recreational boating seasons. Since lobstering and recreational boating impact upon the composition of the Sandwich-based fishing fleet during different times of the year, the composition of the fleet is discussed for two half-year periods, summer (April-September) and winter (October-March).

During summer the East Boat Basin is very active with recreational boating activity. Summer is also the peak lobstering time of year. These two activities restrict the number of larger commercial fishing boats that can use the basin to about 20 or 25. Other fishing boats that desire to use the basin must homeport at other ports on Nantucket, Martha's Vineyard, Cape Cod or Block Island.

The winter season brings a cessation of lobstering and recreational boating. These boats are taken out of the water and some of them are stored on the Sandwich Marina parking lot for the winter. This frees up mooring space during the winter for use by fishing boats from ports that

freeze up. About 11 trawlers, draggers and scallopers use the basin as their homeport in the winter and moor in areas vacated by the lobster boats and recreational boats. Additional transient fishing boats also use the basin during the winter on a short term basis, e.g., seiners come up from New Jersey or North Carolina to fish for herring. Therefore, the actual number of boats using the East Boat Basin during the winter may be greater than indicated in Table 12, but would fluctuate daily.

Table 13 gives the number of boats that use the East Boat Basin as a homeport during various seasons, and the appropriate number of crew who work these boats.

Table 13

Total Number of Boats Homeporting at Sandwich and Crew

<u>Season</u>	<u>Type of Boat</u>	<u>Number of Boats</u>	<u>Crew per Boat</u>	<u>Total Crew</u>
Summer	Lobster	20	1.5	30
	Trawler	18	3.2	58
	Scallop	6	6.5	39
Winter	Trawler	8	3.2	26
	Scallop	<u>3</u>	<u>6.5</u>	<u>20</u>
Total		55		173

NOTES:

1. The number of boats under winter refers only to the additional boats that homeport at the basin during winter. These boats utilize space vacated by the lobster and recreational boats.
2. The crew per boat values came from the source: An Economic Profile of the Cape and Island Fisheries, Cape Cod Planning and Economic Development Commission, 1978.

The Sandwich fishing fleet is comprised of mostly older boats, some over 50 years old. The average larger vessel size is about 45 feet to 55 feet in length, which is small by today's standards. The local fleet is also in somewhat of a decline due to the inefficiencies of the East Boat Basin. Its restrictive size and depth limitations preclude the local fishermen from investing in newer larger vessels which they have expressed interest in doing. The possibility exists for investing in smaller, new, more efficient boats, but several factors discourage implementation of this alternative. Today's economic conditions require that fishermen utilize the economy of scale in order to keep up with rising fuel costs and mortgage costs. Another factor is the inefficiency of mooring within the basin. Rafting of many boats together, such as in the East Boat Basin, results in delays in getting to the fishing grounds. This

situation would remain even if new boats were rafted. Small boats must wait for larger boats to be unloaded along the bulkhead, resulting in further delay because the bulkhead finfish dealers are high-volume oriented and prefer to offload the larger transient vessels first. The result of the inefficiencies, lack of proper facilities and other factors is minimal opportunity for local fishermen to upgrade the fleet. Without improvement of the existing basin the local fishing fleet will gradually decrease in productivity.

The Sandwich fishing fleet operates on a daily basis along the inshore areas of Cape Cod Bay and south of Cape Cod, and around the cape islands. The fishing grounds are shown in Figure 6. Species fished for are mostly flounder, other groundfish, scallops and lobster. The local fishing fleet provides approximately 21.5 percent of the fish landed at Sandwich. Table 14 gives this breakdown for the year 1977.

Table 14

Fish Landed at Sandwich - Sandwich and Non-Sandwich Boats, 1977

<u>Home Port</u>	<u>Pounds Landed</u>	<u>Value</u>
Sandwich	3,368,000	\$1,558,000
Other	<u>12,239,000</u>	<u>3,927,000</u>
Total	15,658,000	\$5,485,000

Source: An Economic Profile of the Cape and Island Fisheries, Cape Cod Planning and Economic Development Commission, 1978.

Inshore lobster for the most part is offloaded by the fishermen themselves. Finfish fishermen can only offload and sell their catch to one buyer, which is somewhat of a disadvantage in marketing their fish. The fish buyers operate on a large volume basis servicing mostly larger transient vessels. Therefore, prices offered to fishermen for their fish are commensurate with a large volume business. The local fishermen, who have small boats and therefore land less fish, must accept the price offered. They, however, do not have the economy of scale to offset the lower volume-based prices. The wholesaler cannot increase the prices for the local fleet, since that would be poor business practice.

Existing offloading and mooring conditions also present problems to the local fishing fleet. When fishing vessels, particularly the smaller, older, Sandwich boats, offload along the bulkhead they get banged against it from the wakes of passing boats and ships. The smaller boats also spend a large amount of time maneuvering in the canal while waiting for large fishing vessels to complete offloading operations. This causes potential collision problems; however, the Sandwich boats must wait to offload in order to minimize possible spoilage of their catch. Mooring of fishing vessels in the basin has developed haphazardly. Each fisherman

must stake out or obtain his own place and method of mooring. A cooperative effort on the part of the fishermen has found that rafting of vessels from the one large pier is most efficient use of existing space. This system however is unsafe, causes delays and damages vessels.

The third component of the Sandwich fishing industry is the transient fishing fleet, which consists of boats that homeport elsewhere but find Sandwich a convenient location for offloading fish. Homeports of these transient vessels most often are New Bedford-Fairhaven, Provincetown and Point Judith in Rhode Island. Vessels from nearly all the regional ports and even boats from Maine to North Carolina find Sandwich a good location to offload when moving between the fishing areas north and south of Cape Cod.

Transient vessels are mostly large (70'-110') offshore vessels that fish the Georges Banks area. Species landed by these boats include herring, flounder, other groundfish and lobster. The transients offload at all of the bulkhead wholesalers, providing over 78 percent of the total amount of fish landed at Sandwich.

Some of the fishing vessels presently homeporting in other ports, (e.g. Fairhaven), have owners who reside in Sandwich and would probably homeport in Sandwich if the facilities were there. Also, it is very likely that a sizeable number of vessels, other than the aforementioned transients, would transfer to the East Boat Basin from other ports. Other vessels would continue to fish in the region only on a seasonal basis, (e.g. for herring during winter), and then return to their own region to fish during other seasons.

Large transient boats encounter the same problems on the bulkhead as do the smaller local boats, but damage is less because their larger size enables them to withstand more punishment. Large transients do not utilize the basin to layover because of inadequate space and depth. As stated earlier the large transient vessels usually get priority for offloading. The transients are also more flexible and can take their catch to other ports if market conditions dictate or it is too crowded at Sandwich.

The transient fishing fleet is an important component of the Sandwich fishing industry for two reasons. It provides by far the largest percentage of fish landed at Sandwich, and it indicates how favorable a location Sandwich is for offloading fish. A logical assumption can then be made that a good offloading location is also a good homeport location, should the proper facilities be available.

Regional Fishing Ports

The Cape Cod region has a sizeable commercial fishing industry. A survey was made of four major commercial fishing harbors within close proximity to Sandwich. These ports are New Bedford, Provincetown, Chatham

and Plymouth. Included in the survey were fishing fleet characteristics, types of marine resource landed, existing facilities and the possibility of future improvements in the harbor. Table 15 shows the amount of total marine resource in millions of pounds landed at each port, including Sandwich, for the past several years.

Table 15
Fish Landed at Regional Ports

<u>Port</u>	<u>1977</u>	<u>Millions of Pounds</u>		<u>1980</u>
		<u>1978</u>	<u>1979</u>	
New Bedford	75.5	71.9	86.0	99.6
Provincetown	17.9	19.9	23.4	25.8
Chatham*			11.5	13.8
Plymouth*			3.5	3.9
Sandwich	15.3	19.0	19.1	14.2

Source: National Marine Fisheries Service
* Operations Division, NED, Corp of Engineers

The locations of the four regional ports and other major fishing ports are shown in Figure 7. Characteristics of the regional fishing ports are discussed below.

New Bedford - New Bedford Harbor also includes fishing vessels homeporting in Fairhaven, which lies across the harbor from New Bedford. Approximately 200 fishing vessels ranging from 50 to 110 feet in length homeport in New Bedford Harbor. They are mostly large offshore trawlers that fish for scallops, haddock, flounder and cod. This fishing fleet, is the largest of those discussed in this regional analysis, and is very modern with most vessels being less than 15 years old.

Improvement of the existing navigation system is not foreseen in the near future. New Bedford and Fairhaven Harbors were the subject of a small navigation study examining the feasibility of improving the existing channels. Problems in locating an economically feasible and suitable disposal site for the proposed improvement dredging caused the proposal to be dropped in 1971.

Provincetown - The Provincetown fishing fleet consists of approximately 60 homeporting vessels ranging in length from 35 to 100 feet. A large number of transient vessels also utilize the harbor for offloading fish and are usually larger averaging about 80 feet in length. The type of marine resource landed is mostly groundfish, including haddock, cod and yellowtail flounder.

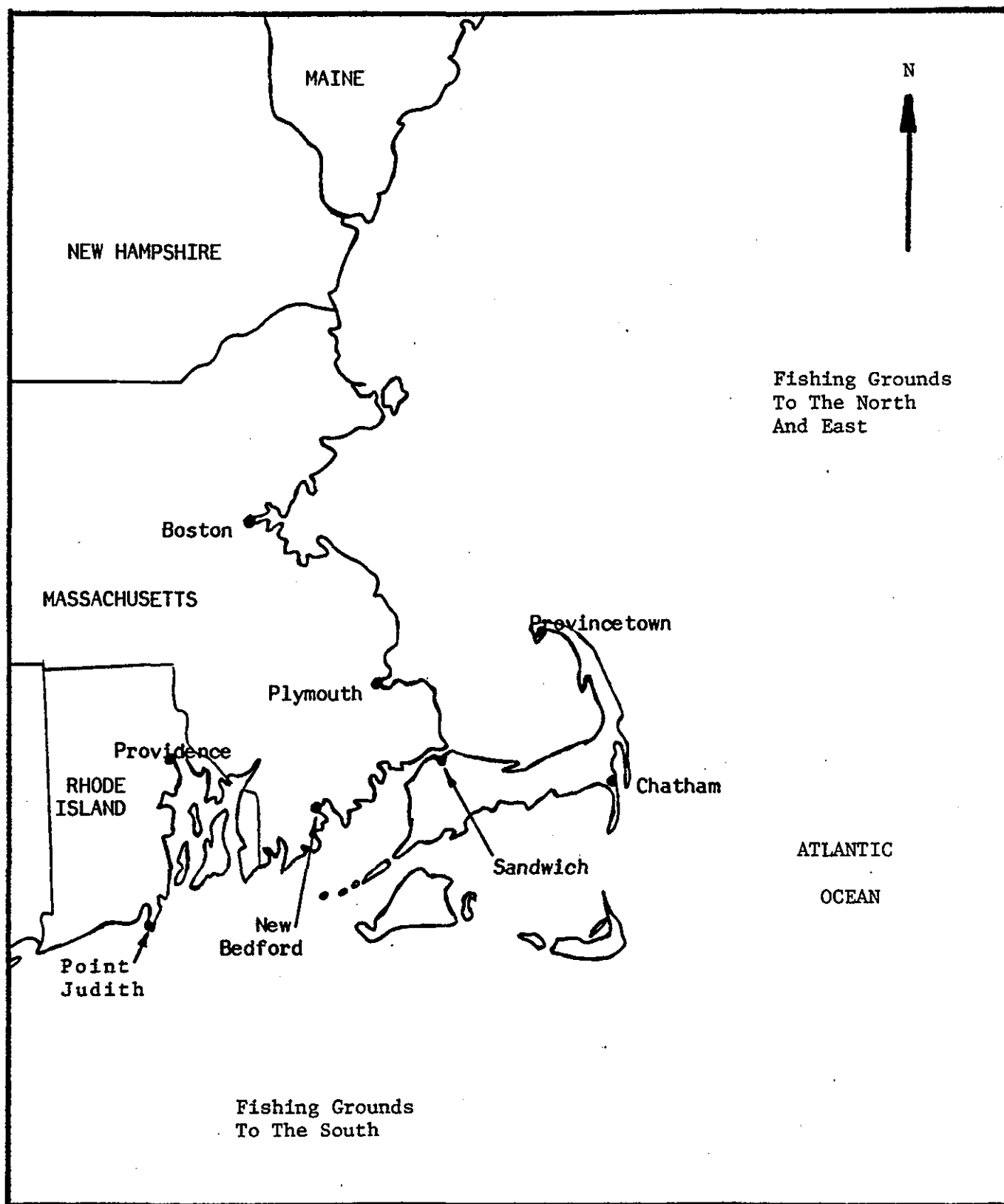


FIGURE 7 - SANDWICH AND NEARBY FISHING PORTS

Several problems face Provincetown as a commercial fishing harbor, including inadequate offloading facilities, a lack of adequate anchorage area, and a lack of protection from southwest seas. The present town pier is deteriorating and not providing adequate offloading services. The existing anchorage cannot accommodate all fishing vessels, and southwest seas are causing increased damage to the pier and to vessels not able to anchor behind the present breakwater during storms. These problems are presently the subject of a small navigation study.

Chatham - The Chatham fishing fleet consists of about 120 small boats ranging in length from 16 to 48 feet. It is basically an inshore day-type fleet utilizing longline and handline techniques for catching finfish and groundfish. Lobstering and shellfishing are also major portions of the Chatham commercial fishing industry.

Chatham is located along the outside of Cape Cod, where littoral processes cause a constant shifting of sand. The existing Chatham Harbor inlet is exposed to this action, causing it to shoal easily. The resultant tidal delays when transiting the shoal harbor entrance prevent large boats from using the harbor. Small boats historically have used the harbor.

A reconnaissance report that examined the above shoaling problem was completed in 1979. The report found that improvement of the harbor inlet was not economically justified.

Plymouth - The Plymouth fishing fleet consists of about 55 vessels ranging in length from 30 to 85 feet. Over 60 percent of the fleet is made up of 30 to 40 foot lobster boats. The remaining vessels include small draggers (40'-70') and gillnetters. The major species of marine resource landed are groundfish and lobster.

No commercial fishing development plans are being made for the immediate future; however, long range plans for fish processing facilities are being considered. A small navigation study will be performed in the near future to examine navigation problems within Plymouth Harbor.

The four regional commercial fishing ports have navigation facilities now being used to their maximum capacity. Three of the ports, New Bedford being the exception, require additional facilities in order to service the existing fleet more efficiently. The development of facilities for expansion purposes does not appear likely in the near future for any of the ports.

Of the four ports, only New Bedford has fish processing facilities. It is the most developed port and can provide all types of marine services. Plymouth is the only other port that provides a small amount of marine services. It has several marine railways for repair of vessels to 100 feet in length. Plymouth, Provincetown and Chatham provide locations to land fish, which are then trucked to processing facilities or fresh

fish markets in New Bedford, Boston and New York. All other services (ice, fuel, offloading space, mooring area, etc.) are minimal at Provincetown, Plymouth and Chatham. The overall conclusion that can be reached concerning the commercial fishing industry of the region is that there is a drastic need to improve existing facilities, in addition to providing expansion capability.

Recreational Boating

Recreational boating at the basin has developed concurrently with the fishing activities. Early recreational boating consisted of transients who used it to layover during extended cruises. As the Cape Cod Canal area became recognized as a potential recreational area and tourist activities increased, the East Boat Basin was seen as a potential recreational harbor. This increased recreational demand, coupled with increased commercial fishing activities in the 1950's, caused expansion of the basin to occur in 1963.

The expansion area is leased to the town of Sandwich by the Corps of Engineers. The town operates a recreational boating marina, the Sandwich Cape Cod Canal Marina, which is open to the general public. The marina provides about 72 slips for boats ranging up to 50 feet in length. Twelve of these slips are designated for transient boats. The boats actually using the slip area number about 82, because some of the smaller boats berth between docks running parallel to the shore, and the shore. Subtracting out the 12 transients leaves a permanent fleet of about 70 boats, consisting largely of motor powered runabouts, sterndrives and some larger cabin cruisers. There are only a very small number of sailboats in the permanent fleet, including only two or three larger cruising sailboats with auxiliary power. There are no daysailers. Currents in the canal are quite hazardous, requiring sailboats to navigate the area on auxiliary power. The hazardous currents have been the major factor in keeping the percentage of permanent sailboats lower than what might be found in a typical harbor.

The Sandwich Marina also maintains a waiting list of boats that desire to obtain berthing space at the East Boat Basin. Requests for space date back to 1973. There are now 116 boats on active file, of which about 18 are sailboats ranging from 18 to 50 feet in length. The waiting list indicates that the percentage of sailboats at the East Boat Basin would increase to about 11 percent of the fleet if facilities are provided. Table 16 shows the breakdown by size for the existing permanent fleet, boats on the waiting list and the total.

Table 16

Breakdown by Size of Sandwich Recreational Boats

<u>Boat Size</u>	<u>Existing Fleet</u>		<u>Waiting List</u>		<u>Total</u>	
	<u>Boats</u>	<u>Percent</u>	<u>Boats</u>	<u>Percent</u>	<u>Boats</u>	<u>Percent</u>
under 20'	19	27.1	44	37.9	63	33.9
21' to 24'	15	21.4	33	28.5	48	25.8
25' to 29'	10	14.3	22	19.0	32	17.2
30' to 35'	10	14.3	10	8.6	20	10.7
36' to 43'	9	12.9	3	2.6	12	6.5
43' to 50'	<u>7</u>	<u>10.0</u>	<u>4</u>	<u>3.4</u>	<u>11</u>	<u>5.9</u>
TOTAL	70	100.0	116	100.0	186	100.0

Table 16 was developed from observation of the East Boat Basin and information from the harbormaster. The table shows that most of the recreational fleet is composed of boats less than 25 feet in length, facilitating the possible use of rack storage.

The present marina facilities include a system of floating docks, a fueling station and a boat launching ramp. The recreational boat slips have electricity and water available. There are no dockside sewage pump-out facilities. A fuel dock located on the east side of the basin provides both diesel fuel and gasoline. In 1978, 100,000 gallons of each was pumped. The launching ramp provides access for trailered boats and approximately 4,000 launchings occur per year. The marina parking lot is available for on-land storage of boats during the winter.

Transient recreational boats also use the basin extensively. These vessels are primarily larger cruising sailboats (25+ feet) that cruise along the New England and eastern U.S. coast. They utilize the Cape Cod Canal to shorten coastal routes and also to reduce the exposure to open ocean conditions such as those encountered along the outside of Cape Cod. The basin location is very convenient, since it is right on the cruising courses of sailboats, which use the East Boat Basin to layover at night or to wait for the tide to turn. It is a common occurrence to have many boats waiting in the basin to transit the canal with the current. Transient boats have historically used the basin as a harbor of refuge, a practice that should be maintained. In 1979, 733 transient boats used slips. This does not include transients that are required to moor in the open areas because of a lack of slips. On an average day, about 15-20 transients may be at anchor in the basin. During peak holiday periods, up to 50 transient boats at anchor fill the basin to capacity under congested conditions. Consideration of the transient recreational fleet is important since it impacts the other permanent activities within the basin.

Regional Recreational Boating

The entire Cape Cod region is used extensively for recreational boating. The East Boat Basin is a very desirable location since it is centrally located and provides many boating opportunities. It gives easy access to Cape Cod Bay, and Buzzards Bay is reachable through the Cape Cod Canal. Over 25,000 recreational boats pass through the canal annually, and a large percentage of these stop at the East Boat Basin.

The nearest recreational harbor is in Onset Bay about 10 miles west through the canal. This harbor primarily services recreational boating in the Buzzards Bay area. The nearest recreational harbors on the Cape Cod Bay side are Plymouth, 20 miles to the north, and Barnstable, 15 miles to the southeast.

The East Boat Basin provides access to recreational boating for a sizeable area, but the present basin does not have the capacity to meet the demand for recreational boating in this area.

Other Basin and Surrounding Activities

Several other activities besides commercial fishing and recreational boating occur around the East Boat Basin. These include recreational activities engaged in by the public while visiting the basin, and the operations of various businesses and Federal agencies.

The recreation area at the East Boat Basin was cooperatively developed by the Corps of Engineers, the Commonwealth of Massachusetts and the town of Sandwich. The 1963 basin expansion is leased to the town of Sandwich by the Corps of Engineers for a period of 25 years. The Commonwealth built the launching ramp, 150-car parking lot, boat slips and restroom facilities at the launching ramp. The Sandwich Marina Corporation manages the area for the town.

The Corps of Engineers owns and administers two recreation areas at the basin, one on the west side and the other on the east side. Both areas are provided with picnic tables, parking areas and restroom facilities.

The East Boat Basin recreation area has one of the highest visitation rates in the canal area with over 250,000 annual visitors who enjoy sight-seeing, fishing and picnicking. The basin provides a close-up vantage point to observe ocean-going vessels transitting the canal, particularly large tankers en route to the adjacent power generating plant. Basin visitors also enjoy watching the commercial fishing operations and boating activities within the basin. The bulkhead allows easy access for sport fishing enthusiasts, enabling them to fish without having to climb over riprap. The provision of picnic tables allows picnickers to relax and observe the scenery while eating. The basin recreation area also provides access to the Cape Cod Canal service road, which is open to joggers and bicyclers.

Two Federal agencies have operations at or near the East Boat Basin. The Coast Guard has an administrative building approximately 600 feet east of the basin and a berthing facility for several Coast Guard boats up to 45 feet in length. The Corps of Engineers maintains a small float in the northwest part of the basin, in conjunction with the operation of the Cape Cod Canal.

Other businesses in the immediate vicinity include two restaurants and a petroleum tank farm to the southeast and the Canal Electric Company power generating plant to the west.

Sandwich Bulkhead

The Sandwich bulkhead is located just outside the East Boat Basin on both sides of the basin entrance along the Cape Cod Canal. About 500 lineal feet of bulkhead is located on the west side, and about 1,100 lineal feet on the east side, for a total of 1,600 lineal feet. The bulkhead is an integral part of the activities in and around the East Boat Basin, and serves a variety of uses.

Use of the bulkhead is administered by the Corps of Engineers, which leases bulkhead space to various users. The lease agreements are with the fish offloaders, a petroleum operator and the U.S. Coast Guard. Canal Marine, Inc., leases from the Corps a small parcel adjacent to the canal for the purpose of offloading fishing boats. In turn, the Corps leases from Canal Marine a small parcel adjacent to the west side of the East Boat Basin entrance. Lease agreements with the fish operators are 5 years in duration. Northeast Petroleum Corporation has lease agreements allowing it to lay pipe from the canal to its upland tank farm. They also allow Northeast Petroleum to tie up to the bulkhead when offloading petroleum from barges. There is no expiration date on lease agreements with Northeast Petroleum. The U.S. Coast Guard has various lease agreements for use of piers within the basin, utility easements and maintaining of a boathouse. The boathouse lease has expired and will not be renewed. The remaining leases are generally 5 years in duration. Figure 8 shows the bulkhead use and parties that have lease agreements.

The Corps of Engineers does not use the bulkhead extensively under normal operating conditions; however, the bulkhead is a necessary component of the Cape Cod Canal navigation system. It is used to stabilize and retain the shoreline along that particular reach of the canal. Other uses have developed over the years, primarily offloading of fish. Recreational fishing, Coast Guard operations, petroleum product offloading and tying up of vessels for other purposes are also carried out. The bulkhead provides a convenient place for tugboats to tie up while waiting to assist large ships transitting the canal, for floating plant that is maintaining the canal, and for Corps of Engineers activities, including emergency operations. The Sandwich bulkhead is the only place near the east end of the canal that could be used as a base of operations in coping with emergencies (e.g. oil spills, groundings, etc.).

The bulkhead is now at such a point of deterioration that rehabilitation or replacement of it in the near future is under consideration. The Corps of Engineers has studied the problem and is developing a plan of improvement.

PROBLEM IDENTIFICATION

This section of the report discusses possible future conditions that could occur at the East Boat Basin should the Federal government not participate in an expansion project. Navigation problems and related needs, as identified through coordination with public interests and examination of the existing conditions, are described. The potential opportunities that would surface as a result of addressing the problems and needs are also discussed.

FUTURE CONDITIONS

The future conditions for the study area were considered with respect to a lack of Federal participation in an expansion project. They were considered so that the most likely future condition could be determined for use in evaluating the effects of alternative plans.

Three possible future scenarios could occur at the East Boat Basin; no change, an increase in basin efficiency or implementation of basin expansion to some degree. All of the future scenarios are based on the premise that existing commercial fishing, recreational boating and other related activities will continue to occur at present levels. The existing activities have been well established for many years, and are not expected to change drastically.

Scenario 1 - No Change

Present conditions, which have remained unchanged for over 20 years, could continue well into the future. With no prospect of Federal participation in a basin expansion project, local interests would be disheartened and drop any plans for a basin improvement project. Commercial fishing and recreational boating levels would remain substantially the same. However, the homeport fishing fleet could see a gradual decrease in productivity as it continues to be subjected to constraints imposed by the existing conditions. The existing development in the area would remain essentially the same except for possible reorganization of some activities along the bulkhead, and most likely the town's parcel of property would be developed for industrial or business uses.

Scenario 2 - Increase Basin Efficiency

Under this scenario, local interests would also drop basin expansion plans because of a lack of Federal participation. However, they would implement some type of efficiency - increasing measure to make better use

of the existing basin. Two possible measures were identified that would increase efficiency in some way; provide additional slips to increase the fleet size, or provide additional offloading opportunities within the basin to increase fish landings. Both of these possibilities could be accomplished at much less cost than an expansion project.

A cooperative planning effort by the town of Sandwich and the Corps of Engineers is currently underway, which proposes that the town assume management of the entire basin. In conjunction with assuming management responsibility, the town would implement slip berthing in the remaining open areas of the basin. Figure 9 shows the proposed arrangement of slips that would effect maximum utilization of the existing basin. A funding request of \$600,000 for construction of the additional slips has been forwarded to the Commonwealth of Massachusetts.

This plan would not increase the homeport fishing fleet; however, benefits would accrue because of the more efficient configuration. The elimination of rafting would reduce annual damages to vessels, and would allow more fishing time due to delay reduction. The recreational boating fleet would realize a net gain of 42 boats, with the proposed increase of 60 recreational slips. At present, an average of about 18 transient boats anchor in the basin on a daily basis. Since anchoring would no longer be possible, the 18 transients would be allocated to the new slips, giving the net increase of 42 boats to the overall recreational fleet. Recreational boating benefits to the study area would be increased.

The second possible measure would be the construction of additional offloading facilities inside the basin. A sizeable portion of basin water area and shoreline would be required for offloading areas, a channel and a maneuvering area. Increased fish landings by both homeport and transient vessels would result. However, substantial adverse impact would occur to existing basin activities, particularly a reduction in fleet size due to the lost water area.

The future conditions of existing development and land use of the town-owned property would be similar to the no change scenario, except that some of the area adjacent to the basin would be used in conjunction with the basin efficiency measures. These could include parking areas, rack storage facilities and offloading facilities.

Scenario 3 - Expand Basin

Under this scenario, the town of Sandwich would proceed with the project without Federal funding, thereby relying entirely upon a mixture of private and local financing sources. Although the lost Federal funding would not comprise a major portion of financing needed, it would represent a substantial amount. The lack of Federal funding could have several impacts on the project, including the inability to provide expansion to the desired extent and causing implementation to be substantially delayed in order to secure the necessary funding.

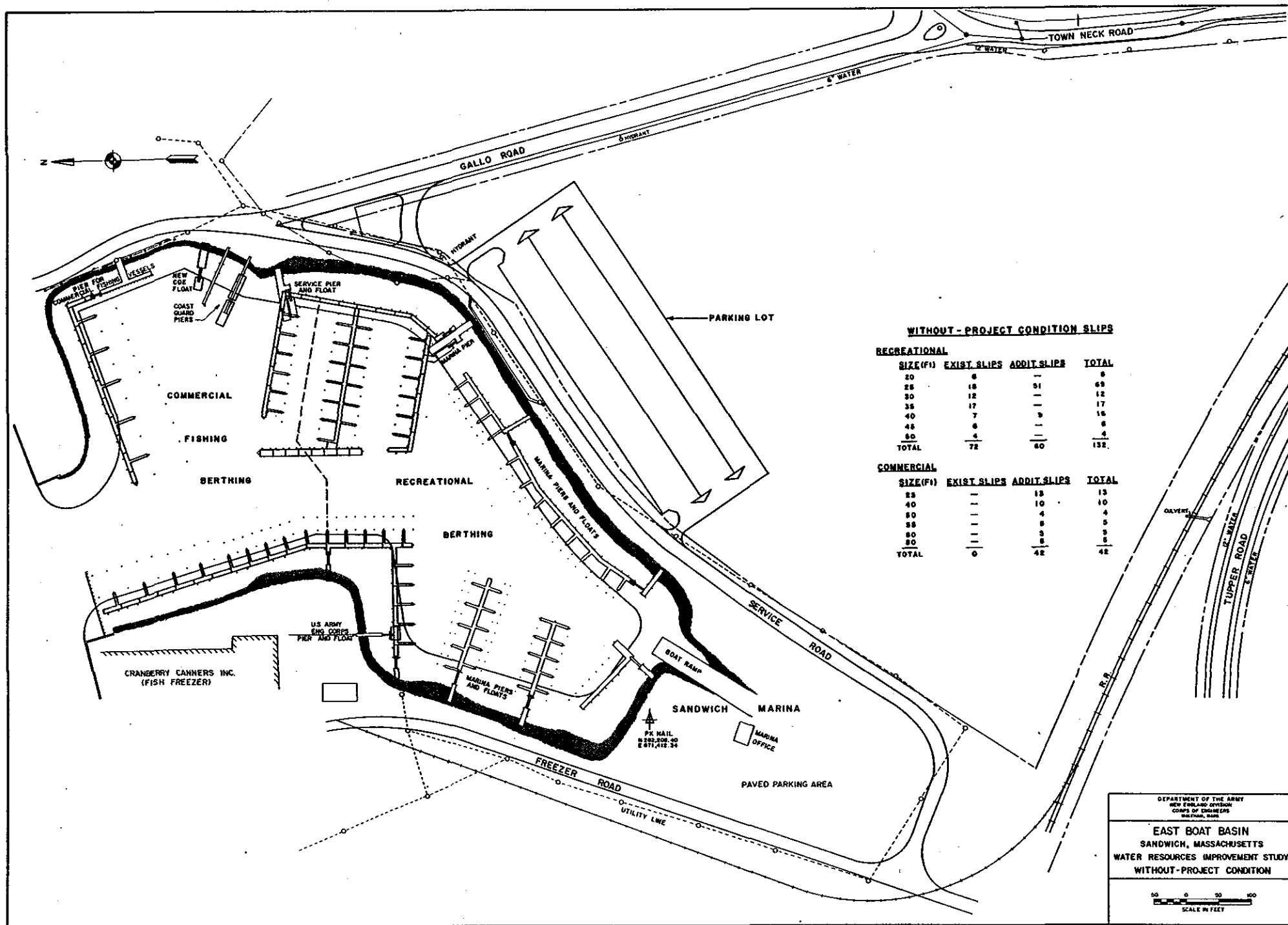


FIGURE 9

Some degree of navigation improvement would be provided, resulting in navigation problems and needs being met, based on the level of improvement. There would be increases in commercial fishing and recreational boating activities, and the harbor would be able to provide additional services. Future conditions of existing development would be the same as the no change scenario. Development around the expansion would consist of support and ancillary facilities desired by local interests. If the degree of expansion is small, then any remaining town property would most likely be utilized for industrial or business purposes.

Most Probable Future

Scenario 1 appears to be unlikely since local interests recognize that the existing basin improvement is already underway, and therefore, an assumption that conditions will remain the same in the long-term future is unrealistic.

Scenario 3 may be possible, but probably be unlikely because of uncertainty in obtaining the large amount of financing necessary. The town of Sandwich, with its annual budget of about 16 million dollars, does not feel capable of financing a large project. Without Federal participation, the probability of funding the desired level of improvement would decrease drastically because of limited sources of low-cost financing.

It is felt that Federal participation would greatly increase the probability for implementation of an expansion project. This study represents a preliminary step in the planning of development at the East Boat Basin by local interests. In effect, they are requesting consideration for Federal participation in the proposed project through the program under which this study is authorized. The recommendation for Federal participation, if approved for implementation, would have a catalytic effect substantially increasing the chances for implementation. It would be an impetus to local interests in soliciting the necessary additional funding from other public and private sources, and would provide an element of confidence to draw other sources of financing into the project. Thus, participation by the Federal government would increase the probability of implementing the most desirable plan that maximizes the contribution to National Economic Development (NED). Navigation problems and needs would be more fully addressed by the development of a full-service harbor, and a greater opportunity to capitalize on commercial fishing and recreational boating would be realized.

Scenario 2 has been selected as the most probable future. Implementation of an efficiency-increasing plan makes sense and can be done with minimal expense. The alternative proposing slip berthing appears most likely since plans have been developed, and implementation of it has been recommended. It is highly unlikely that the increased

offloading area alternative would be implemented after the slip berthing alternative is in place. Therefore, the additional slip berthing alternative is considered the most probable future.

The most probable future condition was established as the without-project condition, for purposes of evaluation and comparison of the with-project alternatives.

PROBLEMS, NEEDS AND OPPORTUNITIES

The problems, needs and opportunities of the study area were identified to serve as a basis for the formulation of alternatives. This was accomplished by examining existing conditions, through consultation with public interests to obtain their views regarding items to be addressed by the study. The problems, needs and opportunities are discussed below.

Problems and needs refer to the study area conditions that limit and constrain the present basin activities. In other words, the existing conditions are preventing the most efficient use of the present facilities. Opportunities, on the other hand, provide the chance to advance conditions beyond the point of most efficient use by providing additional improvements. The East Boat Basin provides both problems to be solved and opportunities that can be capitalized on.

There are several problems that currently plague activities at the East Boat Basin. Navigation conditions within the basin are crowded and haphazard, particularly in the summer. There is insufficient space during this time for all commercial fishing vessels to homeport at Sandwich. Also, the influx of transient recreational craft that anchor in the basin makes navigation very difficult. The commercial fishing mooring area is inefficient. The larger vessels raft out from the large pier, and smaller boats anchor along the east side of the basin. The safety of rafting vessels is questionable, and it delays fishermen waiting for other fishermen to disengage from the raft of boats. The constant abrasion and bumping of boats also causes damage. The disorganized state of basin conditions poses potential conflict and safety problems, as a result of collisions or near-collisions. A major contributing factor to this problem is that an attempt is being made to satisfy all basin users with only limited facilities, rather than restricting use for some users.

There are two problems that are not directly related to inadequate navigation facilities, but that could possibly be addressed by implementing navigation improvements.

The offloading of fishing craft along the Sandwich bulkhead is hazardous, since canal currents and waves from passing ships subject vessels to collisions with the bulkhead. This is a major concern for the homeport fleet because of its smaller and older vessels, which cannot stand up well to this kind of action. This is not a major problem for the larger and newer transient vessels.

The Sandwich fishing fleet is a day-type fleet of smaller vessels, due to the restrictive basin dimensions. This causes marketing problems. There is no area for individual fishermen to unload and market their fish. They must deal with one bulkhead fish buyer and receive high volume prices, while not being able to offset the lower prices with economy of scale because of their small catches. Also, in dealing with only the one buyer they are restricted to selling a limited variety of species. A further complication faced by the small Sandwich boats is that they must wait for large vessels to be offloaded. The smaller boats usually offload every two to three days and waiting increases the possibility of fish spoilage.

Local interests have also indicated related needs, in terms of services, that could be facilitated through implementation of navigation improvements. There is a lack of adequate service facilities for maintenance and repair of vessels. The nearest port available for repair services is Fairhaven, 30 miles away. Marine supplies have to be obtained at other ports or be trucked in. Utilities such as water and electricity are not readily available to fishermen, who usually ask the Coast Guard or fish dealers for use of them. There are no sewage pump-out facilities at the basin. An ice plant would be useful for minimizing fish spoilage, rather than obtaining ice from fish dealers or having it trucked in, which are less dependable sources.

The above problems and needs would be satisfied to some degree if and when the without-project condition occurs. The without-project condition would address the commercial fishing mooring problem and would provide better organization of the existing basin. Recreational berthing would also be increased. However, the basin would remain relatively congested. The related bulkhead offloading and marketing problems would not be addressed. The related service needs could be partially satisfied if utilities are included as part of the berthing plan. The potential for additional services would be minimal since no access to harbor areas would be available for waterfront service facilities.

The major impact that the navigation improvements would have on the study area would be the opportunity to increase contributions to the economy. There is an excellent opportunity for growth of marine activities and related development, which, if addressed, would greatly enhance regional and national economic development (NED).

The greatest opportunity that would be provided by an expansion project lies in satisfaction of the demand to increase the size of the commercial fishing and recreational boating fleets. There is potential for adding new vessels to the commercial fleet to harvest marine resources currently not being fished to capacity. The increased basin dimensions would also allow the local fishing fleet to upgrade to larger, more efficient vessels. Efficiency would be increased, from a regional perspective, by providing facilities for a number of transfer craft from crowded ports. All of these opportunities would contribute to increased

fish landings, which is the economic measurement used in determining the contribution to NED.

There is a demand to provide additional berthing space for recreational boats, as evidenced by the number of requests for space. Also, the East Boat Basin is a favorite stopover location for transient recreational craft. Improved facilities would enhance this activity. The opportunity exists to contribute to NED through recreational benefits as a result of increases to the recreational boating fleet.

In addition to the opportunities for growth, an expansion project would address related problems and needs not addressed by the without-project condition. The implementation of an adequate navigation system would reduce congestion to a safe and manageable level. Additional offloading opportunities within the basin would permit fishermen with smaller fishing craft to offload in a protected location, and would allow them to market their fish. The increased basin perimeter area would provide access to the harbor area for much desired marine service facilities. Expansion of the basin would also provide spinoff opportunities in the form of jobs, additional taxes, leases and dock fees, etc. The Massachusetts Division of Marine Fisheries has also mentioned the possible establishment of a laboratory at an expanded East Boat Basin.

PLAN FORMULATION

This section of the report summarizes the process followed in formulating alternative plans and selecting a recommended plan of improvement. Several of the general formulation requirements are discussed in this section, where as the formulation rationale with respect to the formulation of specific plans is contained in Appendix 2, Formulation, Assessment and Evaluation of Plans.

Consideration of the future conditions, problems and opportunities identified in the previous section, led to the establishment of the planning objectives. Any planning constraints that limited the scope of planning were identified. Plans of others were considered to identify potential conflicts between plans, and to assure consistency of planning in the area. Plan formulation and evaluation criteria were established, potential management measures were considered, and a range of preliminary plans were formulated to address the planning objectives in light of the planning constraints. Iterative assessment and comparative evaluation of plans resulted in the selection of a plan that best addresses the problems and opportunities of the study area.

PLANNING OBJECTIVES

Previous sections presented problems specific to the study area and the opportunities that would result if the various problems are addressed. Based on the identified problems and opportunities, planning objectives were established to help direct the formulation of alternative

plans that best address the problems and needs. Planning objectives were also considered during the evaluation of alternative plans to determine to what degree each plan met the stated objectives. The following planning objectives address both problems specific to the study area and concerns of the overall planning effort.

- Contribute to growth of the commercial fishing fleet at the East Boat Basin during the 1984-2034 period of analysis.
- Contribute to growth of the recreational boating fleet at the East Boat Basin during the 1984-2034 period of analysis.
- Contribute to the safety of navigation at the East Boat Basin by providing an adequate navigation system during the 1984-2034 period of analysis.
- Contribute to the socioeconomic development of the East Boat Basin and surrounding Cape Cod area during the 1984-2034 period of analysis.
- Contribute to the minimization of adverse impacts on environmental resources during the 1984-2034 period of analysis.

PLANNING CONSTRAINTS AND CONCERNS

Planning constraints are those parameters that may limit the scope of available solutions. These constraints in combination with other planning considerations, direct plan formulation and restrict adverse impacts. Planning constraints may include the physical features of the study area, technological states of art, economic limitations and legislative restrictions. Two planning constraints were identified through consultation with the town of Sandwich and examination of the study area.

The town of Sandwich has earmarked 22 acres of land adjacent to the East Boat Basin for the proposed expansion project. Besides this area, the only other vacant land available for potential development is a parcel on the east side of Gallo Road just over 2 acres in size. Expansion of the basin into this area would not provide good basin geometry and would disrupt Gallo Road, which is the main access road for activities on the east side of the basin. The remaining surrounding area would not provide any opportunities for basin expansion, since major disruption of existing development would occur. Therefore, planning for expansion of the basin was limited to the town's property, which is consistent with the town's wishes.

A second planning constraint is that all of the previously mentioned town property would not be utilized entirely for navigation facilities. The local interests are proposing to fully develop the area around an expanded basin to include fish offloading and freezer facilities, marine service facilities, parking, rack storage for recreational boats and other

related business. A substantial portion of the available land would be needed for this development, thereby limiting the size of basin expansion.

A number of other concerns were identified that may limit construction of an expansion project. The time of construction may have to be restricted to periods when less activity is taking place at the basin. When and where to dispose of project material will be subject to, and limited by, state and Federal environmental statutes. With the current state of the economy, potential economic constraints may surface that could adversely impact project implementation.

PLANS OF OTHERS

There are currently two plans of improvement under consideration by others in conjunction with the East Boat Basin. The Corps of Engineers is planning to rehabilitate/replace the deteriorating bulkhead along the Cape Cod Canal, and the town of Sandwich is considering assuming management of the entire basin, in addition to proposing expansion of the basin.

The Corps of Engineers is proposing to remove the entire existing bulkhead system, and replace it with a combination of rock slope protection and steel sheet pile bulkhead. About 700 feet of new bulkhead would be installed, 200 feet fronting Canal Marine, Inc., and a 500 foot section starting about 200 feet east of the basin entrance and extending eastward. The remaining 880 feet of existing bulkhead would be replaced with rock revetment. The 200 foot section will be used for fish offloading, and the 500 foot section will be used for fish offloading, maintenance operations and emergency berthing. The estimated cost of construction is \$3,620,000, and construction is anticipated to begin in fiscal year 1985 at the earliest. Implementation of this plan would require a reorganization of existing uses along the bulkhead. Fish offloading and other bulkhead operations would be consolidated along the new bulkhead, leaving the remaining area for recreation.

Also, implementation of this plan would change the east side of the present basin entrance by replacing the existing bulkhead with riprap revetment, as shown on Figure 10. The construction timeframe of this plan relative to expanding the East Boat Basin is not known exactly; however, at this time construction of the bulkhead replacement plan first appears more probable. Construction impacts resulting from a basin expansion project were considered for both basin entrance possibilities.

A cooperative town of Sandwich/Corps of Engineers plan to maximize utilization of the existing basin is under consideration. This plan was previously discussed in the Condition If No Federal Action Is Taken section, and is shown on Figure 9 of that section. One hundred and two new slips would be constructed at an estimated cost of \$650,000 to \$700,000.

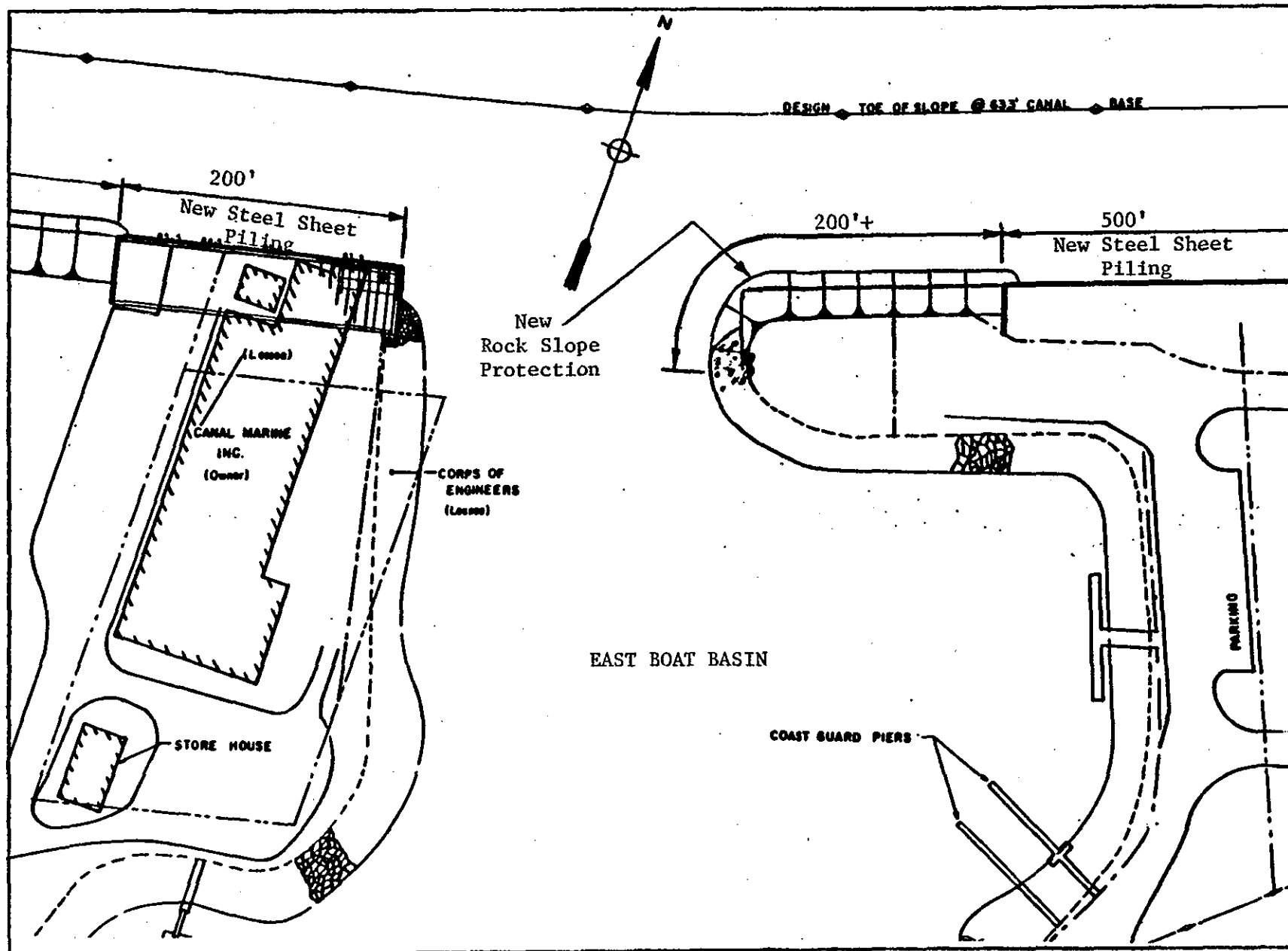


FIGURE 10 - Proposed Future Basin Entrance Condition

In April 1979 a study examining the feasibility of expanding the East Boat Basin was completed for the town of Sandwich. Results of the study indicated that expansion of the basin was economically feasible.

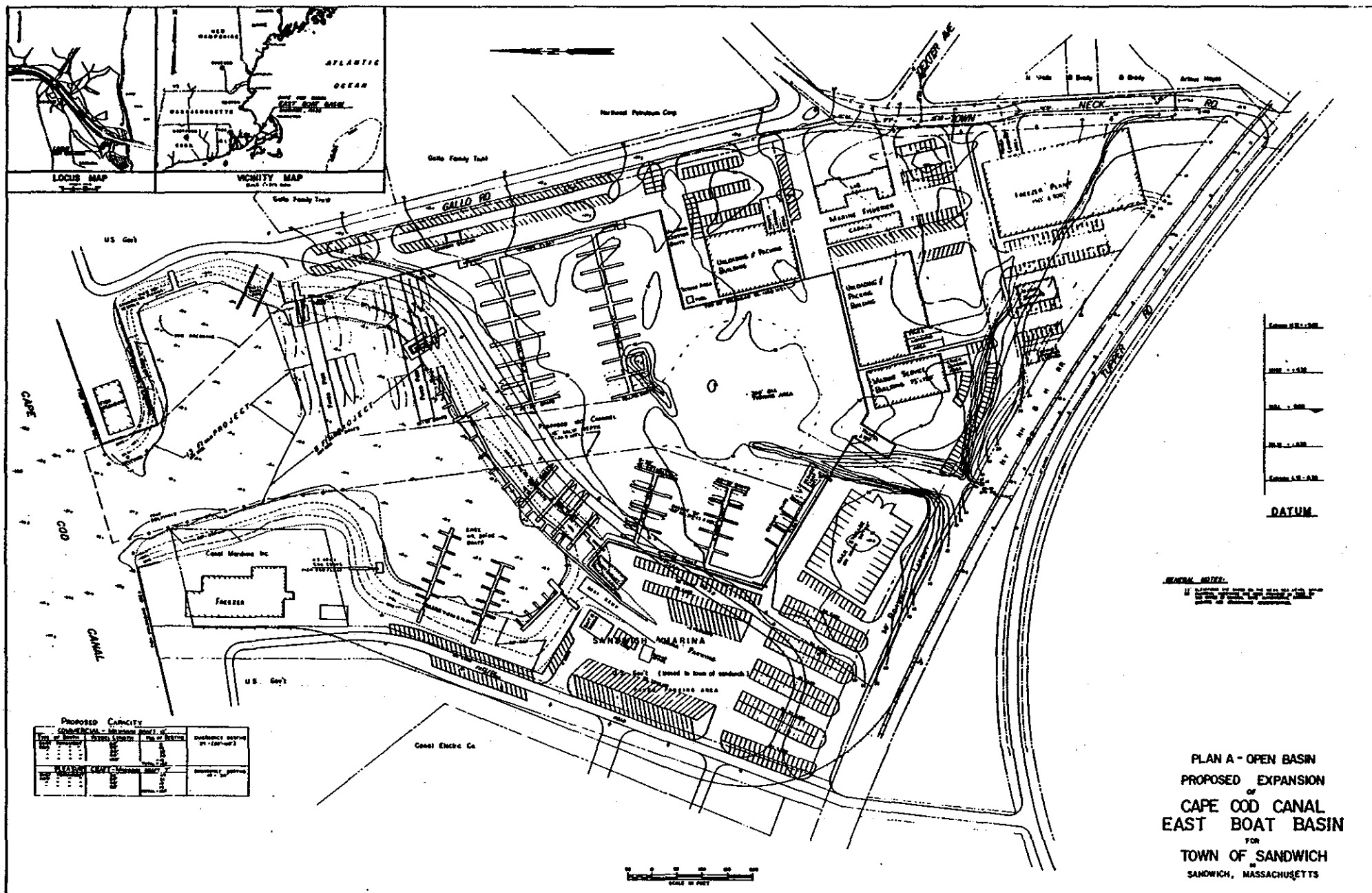
Two plans of improvement were developed, both of which involve physically expanding the basin with a landcut. Plan A is an open basin plan, meaning that one large landcut would encompass all anticipated activities. Plan B is a split-basin plan, meaning that two smaller landcuts are proposed, resulting in a central peninsula that would separate commercial fishing and recreational boating activities.

The study considered the total development of the expanded East Boat Basin, including the water area expansion and landward facilities. However, cost estimates were developed for the basin expansion only. Both the open basin plan (Plan A) and the split basin plan (Plan B) utilized all slip berthing areas for wet storage of boats. Shore stabilization in both plans was composed entirely of steel sheet pile bulkheading. Depths of commercial areas and channels would be -16 feet MLW and depths in the recreational areas would be -8 feet MLW. Major line items for Plan A include \$4.5 million for bulk earth removal, \$1.4 million for docks and piers; \$2.3 million for bulkheads and \$0.8 million for tie back system. Major line items for Plan B include \$4.3 million for bulk earth removal, \$1.6 million for docks, \$3.5 million for bulkheading and \$1.1 million for tie back system. The cost of bulk earth removal also includes lowering of upland grade, which is not navigation related. The total first cost estimates for both plans are \$16 million and \$18 million respectively, in 1979 dollars, and would equal \$21.9 million and \$24.7 million when updated to 1983 costs. The two plans are shown in Figures 11 and 12.

Estimated benefits are increased fish landing benefits of \$7,327,000 and increased recreational boater benefits of \$412,500, yielding total annual benefits of \$7,739,500. This results in a benefit/cost ratio of 5.6 to 1 when the annual benefits are compared with the first cost amortized over a project life of 50 years. The 5.6 figure was based on the first cost for Plan B, using a 6-7/8 percent discount rate.

COORDINATION

Public involvement was an important aspect in performance of the study. It was accomplished through field visits, meetings, workshops, mailings, distribution of reports and telephone communications. Various levels of coordination were maintained with the following publics throughout the course of the study.



Federal Agencies

1. U.S. Fish and Wildlife Service
2. National Marine Fisheries Service
3. Environmental Protection Agency
4. U.S. Coast Guard
5. U.S. Air Force
6. U.S. Army
7. Corps of Engineers

State Agencies

1. Executive Office of Environmental Affairs
2. Coastal Zone Management
3. Division of Marine Fisheries
4. Metropolitan District Commission
5. Department of Environmental Quality Engineering
6. Wetlands Protection Division
7. Division of Water Pollution Control

Local Interests

1. Town of Sandwich
2. Sandwich Harbormaster
3. Town Engineer
4. fish house operators
5. fishermen
6. Sandwich Marina Committee
7. private individuals

The public involvement program began with a public announcement for the initiation of a navigation study at the East Boat Basin. Early meetings with local interests and response to the public announcement set forth the problems and needs of the study area. Sufficient information concerning the type of improvements desired was also obtained, from which a preliminary plan was formulated and evaluated. Reports summarizing the first study iteration were then distributed to interested parties.

Extensive field work was performed to establish the base conditions in more detail, and to obtain input for the formulation of alternative plans. Resource agencies and local interests were consulted concerning the future conditions of an expanded East Boat Basin. Resource agencies assisted in determining marine resource projections, which established the level of future fishing industry that could be supported. Fish offloaders and fishermen provided information on the types and sizes of vessels expected, and types of navigation facilities needed. The harbormaster provided valuable information on the potential growth of recreational boating. The information was utilized to project future conditions at the basin from which alternative plans were formulated.

A second major public input was in the formulation of strategy for disposal of dredged and excavated material. The town of Sandwich, resource agencies, and area towns were coordinated with to assist in identifying and evaluating disposal options.

A final broad based public review will provide the opportunity for many interested publics to comment on the proposed project, thereby identifying any points of concern that may require clarification.

Correspondence accomplished during the study, and public comments to be received after public review of the draft report are contained in Appendix 3, Public Views and Comments.

SELECTION OF THE NED PLAN

The Federal objective of water and related land resources project planning is to contribute to national economic development (NED) consistent with protecting the environment, pursuant to national environmental statutes, applicable executive orders and other Federal planning requirements. Contributions to NED are increases to the net value of the national output of goods and services, expressed in monetary units, and are the net direct benefits that accrue in the planning area and the nation. The contributions to NED do not necessarily have to be restricted to the net value of goods and services marketed, but include also those that are not marketed. Project plans were formulated to alleviate problems and take advantage of opportunities in ways that contribute to the Federal NED objective.

The following section, The Selected Plan, presents the detailed plan that is recommended for implementation. Selection of the recommended plan was based on the results of the formulation and evaluation process followed during the study. Upon consideration of the projected future conditions, available management measures, planning constraints and planning objectives, an array of alternative plans ranging from no expansion to various degrees of expansion was formulated and evaluated. Screening of the preliminary alternatives resulted in a final array of four alternatives (known as Plans A, B, C and D; not to be confused with Plans A and B discussed in the Plans of Others section), for detailed evaluation. The process has been outlined and discussed in Appendix 2, which can be referred to for more insight regarding selection of the recommended plan.

The major criteria for selecting a recommended plan is the contribution to NED. A plan recommending Federal action is to be the alternative plan with the greatest net economic benefit consistent with protecting the nation's environment. This is called the NED Plan. Table 17 below summarizes the estimated annual costs, projected annual benefits and resultant net annual benefits for each plan.

Table 17

Comparison of Net Annual Benefits (in 000's)

<u>Plan</u>	<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>Net Annual Benefits</u>
A	\$770	\$2,948	\$2,178
B	\$1,059	\$3,790	\$2,731
C	\$884	\$3,975	\$3,091
D	\$1,037	\$3,360	\$2,323

Based on Table 17, Plan C provides the greatest net annual benefit, and has been designated the NED plan. Therefore, Plan C was selected as the recommended plan, in keeping with the Federal objective.

While the NED account serves as the primary evaluation criteria, three other accounts were also considered; the environmental quality (EQ) account, the regional economic development (RED) account and the other social effects (OSE) account. These accounts register the plan effects for the secondary evaluation criteria. A summary of the four accounts can be found on Table 2-15, System of Accounts, in Appendix 2.

THE SELECTED PLAN

The culmination of the plan formulation process resulted in the selection of a recommended plan of improvement. Plan C is the selected plan since it provides the maximum net benefits of the four plans studied in detail. The following sections describe the various aspects regarding implementation of the selected plan.

DESCRIPTION

The selected plan would expand the existing East Boat Basin by a total of 12.0 acres, comprised of 9.9 acres of water area and 2.1 acres of riprap slope area. The water area would consist of a 120-foot wide entrance channel, 14 feet deep by 1220 feet long; a 4.5 acre commercial berthing area, 12 feet deep; a 1.8 acre recreational berthing area, 8 feet deep; a 450-foot by 160-foot turning/maneuvering area, 14 feet deep; and a 670-foot by 30-foot offloading area, 14 feet deep. The riprap slope protection would be constructed at a 2 horizontal to 1 vertical slope, with appropriate toe protection, to the bottom elevation of adjacent water areas. The use of bulkhead is proposed in and around anticipated offloading areas. Top elevations for riprap and bulkhead would be established at plus 11 feet National Geodetic Vertical Datum (NGVD), equivalent to about plus 15 feet mean low water (MLW), which would provide protection to the 100-year flood elevation. Figure 13 illustrates the selected plan as compared to the without-project condition.

The entrance channel is proposed to have a 180-foot width at the basin entrance to enhance safety of navigation in this area. The channel

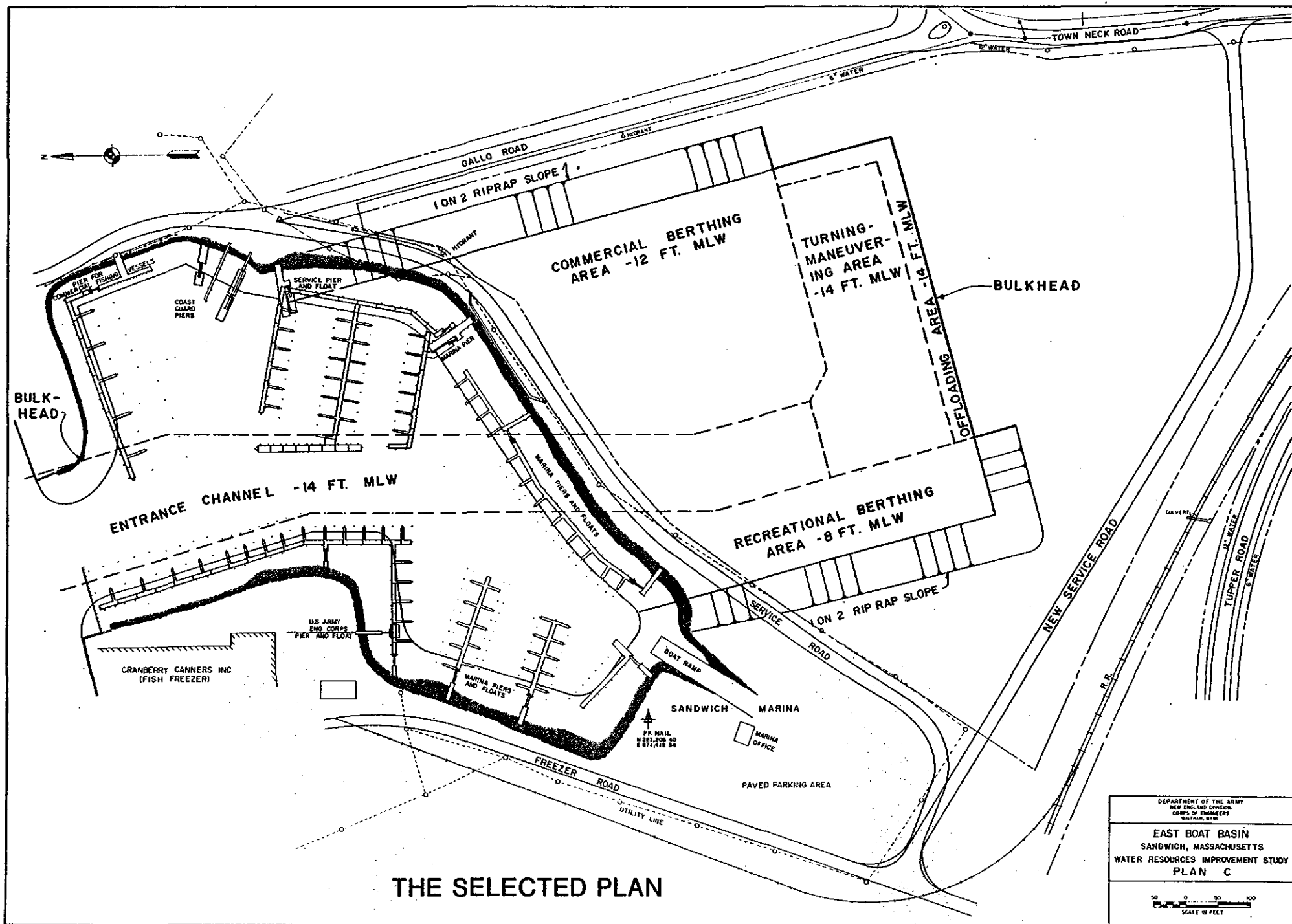


FIGURE 13

line would be superimposed on the existing bulkhead, and with placement of additional bulkheading, material would be removed to provide the necessary channel width without impacting a nearby existing structure. Should the Corps of Engineers' bulkhead replacement plan be in place, then the riprap slope would be moved back to accommodate the channel.

The existing basin would be expanded by excavating a rectangular landcut southward into the property owned by the town of Sandwich. About 504,920 cubic yards of material would be excavated from the landcut, and about 29,550 cubic yards of material would be dredged from the existing basin for a total of 534,470 cubic yards.

Construction of the project would be accomplished with a bucket or dipper dredge. The existing basin areas, i.e., the entrance channel and eastern portion of the basin, would be dredged first. The landcut would then be dredged southward from the existing basin. Land-based construction equipment (bulldozer or frontend loader) would facilitate the dredging by pushing upland material to a location accessible by the dredge. The material would be loaded into scows for transport to the Foul Area dump site, about 50 miles to the northeast in Massachusetts Bay. A location map (Figure EA-1) for the Foul Area is provided in the Environmental Assessment.

Bulkhead would be driven at the appropriate locations prior to dredging to maintain shore stability. Upon substantial completion of the basin expansion dredging, stone protection would be placed on shore slopes. Shore slopes would be constructed on a 1 vertical to 2 horizontal gradient. All project features would be dredged to their appropriate depth (including any overdepth) with slopes between features generally being 1 vertical to 3 horizontal.

Whereas, this study is addressing only the construction of the navigation project, local interests have indicated through their prior expansion study that they would perform construction around the expanded basin. This would most likely occur during the same timeframe, and would initially include the lowering of grade around the expansion and the construction of service facilities. Further construction would also be a local responsibility.

When the project is constructed, operation of the basin would most likely require management by a harbor master. Harbor use regulations would have to be established, with a police authority available to monitor harbor activities and enforce compliance. It may be advisable and/or necessary to develop a traffic control system because of the diverse harbor use. Generally speaking, the operation and maintenance considerations would be the responsibility of local interests. The Federal government would be concerned mainly with marking and maintaining the entrance channel and the turning/maneuvering area, which are the responsibility of the U.S. Coast Guard and Corps of Engineers, respectively. Maintenance of all other berthing areas and shoreline areas would be a local operational concern.

COSTS

The project first cost was estimated at \$7,746,000 in October 1983 dollars. Table 18 below summarizes the cost for each project component and the total cost of the navigation project.

Table 18

Total Project Cost - The Selected Plan

<u>Project Component</u>	<u>Cost</u>
Entrance Channel	\$ 759,000
Turning/Maneuvering Area	641,000
Commercial Berthing Area	1,276,000
Recreational Berthing Area	484,000
Offloading Area	147,000
Bulkhead	2,262,000
Upland Costs	93,000
Subtotal	\$5,662,000
Contingencies	1,132,000
Subtotal	\$6,794,000
Engineering and Design	476,000
Supervision and Administration	476,000
Total	\$7,746,000

The above navigation project cost does not include the cost of slip berthing, since it is not directly related to construction of additional harbor area, (not part of digging the hole, so to speak). Slips are necessary, however, to generate the level of benefit projected for the selected plan. Therefore, the implementation cost for slips was roughly estimated for incorporation into the economics equation. The actual implementation of slip berthing would be a local responsibility. The estimated slip cost is summarized in Table 19.

Table 19

Slip Costs - The Selected Plan

<u>Item</u>	<u>Cost</u>
Recreational Slips	\$ 448,000
Commercial Slips	551,000
Subtotal	\$999,000
Contingencies (20%)	200,000
Subtotal	\$1,199,000
Engineering and Design (7%)	84,000
Supervision and Administration (7%)	84,000
Total	\$1,367,000

PROJECT ACCOMPLISHMENTS

The project would accomplish an increase in harbor area that would provide the opportunity for growth of the recreational boating and commercial fishing activities. Additional berthing area would permit an 11 percent (15 boats) increase in the recreational boating fleet, and a 130 percent (52 vessel) increase in the commercial fishing fleet.

The project would provide a 120-foot wide channel, which would accomplish improvements in the level of navigation safety and efficiency. The turning/maneuvering area would provide sufficient space in the working portion of the harbor to permit safe and efficient maneuvering of vessels during offloading operations.

In addition to accomplishing specific project objectives, the project would encourage development of the surrounding area by local interests. Development would include small boat storage, which would further increase fleet capacity. The development would contribute to the increase in economic prosperity of the area by providing jobs and increasing revenues to the town. Regionally, the East Boat Basin would provide much needed facilities for the commercial fishing industry. The opportunity exists for it to become the premiere fishing port on Cape Cod.

PROJECT EFFECTS

Implementation of the selected plan would produce environmental, social and economic effects. Rather than reiterating environmental and social effects here, they have been discussed in detail in the Environmental Assessment and Appendix 2. However, Table 20, which displays effects of the selected plan on resources of national recognition is contained herein. A discussion of the economic effects is contained in the following section.

Table 20

Effects of the Selected Plan on Resources of Principal National Recognition

<u>Types of Resources</u>	<u>Principal Sources of National Recognition</u>	<u>Measurement of Effects</u>
Air Quality	Clean Air Act, as amended. (41 U.S.C. 1875h-7 et seq.)	No Effect
Areas of Particular Concern Within the Coastal Zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.)	No Significant Concern
Endangered and Threatened Species Critical Habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	No Effect

Fish and Wildlife Habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec 661 et seq.)	An increase in fish habitat comprising an area of 9.9 acres. Wildlife habitat would decrease by 12.0 acres.
Floodplains	Executive Order 11988, Floodplain Management	No Effect
Historic and Cultural Properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec 470 et seq.)	No Effect
Prime and Unique Farmland	CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act.	No Effect
Water Quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)	No Effect (No change in water quality rating.)
Wetlands	Executive Order 11990, Protection of Wetlands Clean Water Act of 1977, (42 U.S.C. 1857h-7, et seq.)	No Effect
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.)	No Effect

ECONOMIC EVALUATION

The total project investment cost, including slip costs, and economic costs for land and interest during construction (IDC), was amortized over a 50-year project life. The discount rate currently applicable to Federal projects is 8.125 percent annually, resulting in an amortization rate of .0829. The equivalent annual charge is \$866,000 for the selected plan.

Historically, maintenance of the existing basin has been minimal. A nominal annual maintenance charge of \$18,000 was developed, and includes maintenance dredging, riprap replacement and maintenance of aids to navigation. The total annual charge is \$884,000.

Annual benefits were determined based on the value of new fish landings, and the value of recreation to new recreational boaters and charterboat fishermen. The annual value of these three benefit categories are \$3,720,000, \$62,000 and \$194,000, respectively, for a total of \$3,976,000. Net annual benefits indicates the value of benefit that would accrue after the investment costs have been accounted for. The economic parameters for the selected plan are summarized below.

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>BCR</u>	<u>Net Benefits</u>
\$884,000	\$3,976,000	4.5	\$3,092,000

COST ALLOCATION

The purpose of cost allocation is to provide an equitable distribution of project costs among project purposes in a multiple-use project. The proposed expansion project includes both specific purpose project features and multiple purpose project features. The cost of specific purpose features is entirely attributable to the specific purpose, whereas the cost of multiple purpose features is allocated to two or more purposes. The entrance channel and turning/maneuvering area are considered multiple purpose, since they are open to general navigation. Table 21 summarizes the percentage of cost attributable to each purpose for each of the project components.

Table 21

Allocation of Multiple Purpose Costs

<u>Item</u>	<u>Purpose (%)</u>	
	<u>Recreation</u>	<u>Commercial</u>
Entrance channel	2.3	97.7
Turning/maneuvering area	2.3	97.7
Commercial berthing area	0.0	100.0
Recreational berthing area	100.0	0.0
Offloading area	0.0	100.0

The above cost allocation percentages, along with cost apportionment regulations, affect the cost-sharing for each project component. Traditionally cost-sharing for commercial uses is 100% Federal and 0% local, and for recreational uses 50% Federal and 50% local. However, these cost apportionment percentages cannot be applied to a number of project components that preclude cost-sharing because of additional regulatory cost-sharing constraints, e.g., the Federal government cannot cost-share in the construction of bulkhead or berthing areas (areas using slips). The various cost apportionment scenarios are summarized in the following section.

COST APPORTIONMENT

This section describes the various project cost-sharing scenarios that could be applied to the selected plan. Cost-sharing of water resource projects at this time is highly uncertain, and a case by case consideration of projects appears to be the present approach. The three cost-sharing scenarios discussed include the encouragement of innovative cost-sharing by the administration, traditional cost-sharing policies and cost-sharing based on existing authority.

Innovative Cost-Sharing

The general thrust of innovative cost-sharing is the requirement to have local interests assume a greater responsibility in financing Federal navigation projects. At the present time, a number of cost-sharing proposals are being considered by the Congress. However, no specific cost-sharing guidance is available to determine a definitive cost-sharing breakdown under the innovative cost-sharing scenario. Therefore, until such time as a cost-sharing proposal acceptable to both the Congress and the Administration is passed, cost-sharing of navigation projects will depend upon the reaching of an innovative financing plans that are agreeable to both local interests and the Federal Government.

The latest proposal developed by the Department of the Army, on behalf of the Administration, for new Federal project construction starts would provide full recovery of certain construction, operation, and maintenance costs. Costs allocated to commercial navigation purposes would require 100 percent cost recovery. Local interests would be required to finance 75 percent of the Federal project up-front, with the remaining 25 percent reimbursed over the 50-year project life. Costs allocated to recreation purposes would remain the same as traditional cost-sharing, with 50 percent up-front from local interests and 50 percent up-front from the Federal Government. Local interests would be responsible for reimbursing all subsequent operation and maintenance costs.

The interest rate for reimbursement purposes would be determined by the Secretary of the Treasury based on the average market yields on outstanding obligations of the United States. Reimbursements for operation and maintenance would be made annually, and may be scheduled and adjusted to reflect the actual operation and maintenance costs. The non-Federal body would be authorized to recover its reimbursement obligations pursuant to these requirements through the collection of user fees from commercial vessels.

Traditional Cost-Sharing

The selected plan as cost-shared under traditional policies, would be 19.5 percent Federal and 80.5 percent non-Federal or \$1,512,000 and \$6,234,000, respectively. The cost-sharing breakdown reflects the cost of

the navigation project only, and not the cost of slips. Local interests would be required to finance the additional cost for slips, estimated at about \$1,367,000.

In addition, the project would require about 12 acres of land at an estimated cost of \$540,000, which would be a local responsibility. The total local interest cost responsibility would therefore be an estimated \$8,141,000 for the overall expansion project.

Existing Authority Cost-Sharing

The selected plan as cost-shared based on existing authority, would be 23.8 percent Federal and 76.2 percent non-Federal. This breakdown indicates that the Federal government would contribute 4.3 percent, or \$331,000, more under this scenario.

In effect, half the cost of constructing the recreational berthing area (not including slips) would be Federally funded, rather than not funded as would be under the traditional method. The reason for this is that the existing authority (House Document 168, 1963 expansion of the basin) recommended marina type slips in the recreational Federal project. A precedent regarding Federal cost-sharing of recreational berthing areas at the East Boat Basin may have been set, and could be applicable to the expansion recreational berthing area. A final determination will have to be made by higher authority concerning this matter.

PLAN IMPLEMENTATION

This section of the report reiterates several points that should be considered in the time between completion of the feasibility study phase and the project implementation phase. Also, the necessary requirements to be satisfied by the participants for implementation of the project are enumerated, and the project authorization process is summarized.

IMPLEMENTATION CONSIDERATIONS

This study investigated the overall feasibility of a navigation expansion project at the East Boat Basin, in addition to considering potential upland development by local interests. Studies determined that the use of slips in both the recreational and commercial berthing areas would be most desirable. The selected plan proposes the use of slips in these areas. Based on Federal policies regarding project cost-sharing, the berthing areas would not be eligible for cost-sharing by the Federal government, along with the offloading area, bulkheading, and upland costs. Only the entrance channel and turning/maneuvering area would be eligible.

Local interests would be responsible for final planning, engineering, construction and operation of project features and related facilities that

are not cost-sharable by the Federal government. In addition to navigation project costs, local interests would be required to implement slip berthing. Maintenance of the entrance channel and turning/maneuvering area would be a Federal responsibility. Existing basin areas not affected by the expansion project, would continue to be maintained under existing authorities.

The local interests are also planning to develop the area surrounding the expansion project, which would occur concurrently, or soon thereafter. This would include lowering of the surrounding grade, and as a minimum, the construction of fish offloading and recreational boating facilities. However, local interests envision much greater development including many marine-related businesses, which expand the scope to a multi-million dollar harbor development project. This additional upland development would entirely be the responsibility of local interests. The Federal contribution of just over \$1.5 million for the navigation project represents only a small percentage of the total financing required for the overall project.

The recommended disposal site for the proposed project is the Foul Area in Massachusetts Bay. Prior to implementation, new disposal opportunities may surface that could change the disposal strategy. The Commonwealth of Massachusetts is presently performing studies of Cape Cod Bay to determine where to locate a designated regional disposal site. Also, some project material may be appropriate for placement on the nearby Town Neck Beach. It may be possible for the town of Sandwich to nourish the beach with selected project material during construction. The town of Sandwich may also identify other uses, since an additional 200,000-400,000 cubic yards of material would be generated from lowering the grade around the expansion, which would require disposal.

Implementation of the project would most likely require the submission of permit applications to both the Federal government and the Commonwealth of Massachusetts. These permits would be necessary for the town of Sandwich to construct in a coastal area, including dredging/excavation, disposal and the placement of fill or structures in the harbor. The specific permits to be filed should be determined during further project planning.

ITEMS OF LOCAL RESPONSIBILITY

In order to implement a Federal project, necessary local sponsorship must be obtained. Local sponsors of the project must determine if the following assurances can be met.

The specific local requirements as contained in the Rivers and Harbors Act are as follows:

1. Provide a cash contribution toward construction costs, determined in accordance with existing policies for regularly authorized projects.

For projects addressing recreational boating purposes a 50 percent first cost contribution is required. (Note: The cash contribution may be subject to change pending final arrangements for project financing.)

2. Provide, maintain and operate without cost to the United States, an adequate public landing with provisions for sale of motor fuel, lubricants and potable water open and available to the use of all on equal terms.

3. Provide without cost to the United States all necessary lands, easements and right-of-way required for construction and subsequent maintenance of the project including suitable dredged material disposal areas with retaining dikes, bulkheads and embankments therefor.

4. Hold and save the United States free from damages that may result from construction and maintenance of the project, except where such damages are due to the fault or negligence of the United States or its contractors.

5. Accomplish without cost to the United States alterations and relocations as required in sewer, water supply, drainage and other utility facilities.

6. Provide and maintain berths, floats, piers and similar marine facilities as needed for transient and local vessels as well as necessary access roads, parking areas and other needed public use shore facilities open and available to all on equal terms. The implementation of slips in the recreational and commercial berthing areas is required to assure that projected fleet increases can be achieved. The financing of such facilities and services is a local responsibility.

7. Establish regulations prohibiting the discharge of untreated sewage, garbage, and other pollutants in the waters of the harbor users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

8. Assure the establishment of additional fish offloading houses within the expanded basin, such that sufficient offloading capacity is provided to handle the projected increase in commercial fishing activity. This should be performed from an overall port perspective, i.e., existing offloaders may be able to handle additional landings, so that facilities within the basin may not have to accommodate the entire increase.

9. Provide a service road around the expanded basin to enable the Corps of Engineers to have continuous access to the Cape Cod Canal project and related projects.

10. Provide sufficient facilities to address the needs of transient recreational craft that desire to use the East Boat Basin. A minimum of 30 berths for transients should be available unless future trends indicate that transient use is changing, in which case the number of transient berths should be modified.

ITEMS OF FEDERAL RESPONSIBILITY

The Federal government's participation in the expansion project would be limited to the entrance channel and turning/maneuvering area. Under the traditional cost-sharing policies, the Federal government would be responsible for funding 100 percent of construction costs allocated to commercial uses, and 50 percent of construction costs allocated to recreation use. Federal participation requires that these areas have access and be open for use by all on an equal basis. Associated maintenance of project features that the Federal government participates in, would be done or paid for by the Federal government.

POST-STUDY IMPLEMENTATION PROCESS

The steps necessary for the plan of improvement to materialize are generally summarized as follows.

Upon completion of the draft Feasibility Report and Environmental Assessment, the Division Engineer releases a public announcement to initiate the public review phase. Draft reports are distributed to Federal, State and local interests for comment. Comments received from public interests during the prescribed review period are addressed, and incorporated into the final Feasibility Report and Environmental Assessment.

The Division Engineer issues a public notice announcing the study recommendations and sends the report to the Board of Engineers for Rivers and Harbors. The board reviews the report and comments in response to the notice and sends its recommendations to the Chief of Engineers who solicits formal review and comment by the Governor and interested Federal and State agencies.

Following the State and interagency review and after receipt of comments of the Office of Management and Budget regarding the relationship of the project to the program of the President, the final report of the Chief of Engineers will be forwarded by the Secretary of the Army to the Congress.

If all reviews find the project to be favorable, Congressional authorization of the proposed project will be required and the report will be submitted to the appropriate Congressional committee for consideration. Congressional procedure normally includes review and hearings by the Public Works Committees and authorization by inclusion in a Water Resources Development Act. Presidential approval of this act concludes the authorizing actions.

When Congress appropriates the necessary funds, detailed engineering and design will begin. Plans, specifications, and detailed estimates will be completed prior to advertising for bids and awarding a construction contract.

Once the construction funds are appropriated, local interests will be called upon to satisfy the requirements of local cooperation, including execution of a contract stating the local cooperation requirements and their legal and financial capability to provide them. After all necessary lands have been furnished, relocations completed and any necessary cash contributions furnished, a construction contract will be awarded and the project will be carried to completion.

VIEWS AND COMMENTS

Public views obtained during the study coordination process are contained in Appendix 3, in the Study Correspondence section. Public comments received after the public review phase of the draft Feasibility Report and Environmental Assessment, and responses to the comments, will be incorporated into the final report in the Public Review Comments and Responses section.

CONCLUSIONS

The proposed expansion of the existing East Boat Basin was found to be economically feasible, based on the commercial fishing and recreational boating benefits expected to accrue as a result of the project. Increased commercial fishing benefits would constitute the bulk of projected benefits.

Plan C, under the all slip berthing condition, would generate the greatest net benefit and therefore is the selected plan. It was concluded that slips would be necessary in the recreational area. In the commercial area, the use of slips would not be a prerequisite for economic feasibility. However, it was found that slips would maximize net benefits and therefore should be implemented in the commercial area also. Berthing of commercial vessels and recreational boats, plus the implementation of dry storage by local interests, would substantially achieve the planning objectives.

The implementation of slips in the berthing areas would impact the project cost-sharing by precluding these areas from Federal cost-sharing. The entrance channel and turning/maneuvering area would be the only project feature eligible for cost-sharing. Local interests would therefore be responsible for implementation of all remaining non-Federal project features.

Environmental impacts from the project are expected to be minimal, based on the quality of project material and the relatively small amount of wildlife habitat that would be affected. Positive environmental

effects may result at the project site and disposal site, further minimizing impacts.

RECOMMENDATIONS

As Division Engineer of the New England Division, Corps of Engineers, I have reviewed and evaluated in the overall public interest all pertinent data concerning the proposed expansion of the East Boat Basin. I have considered the views of other interested agencies, local interests and concerned public during the performance of this study. The possible consequences of constructing the selected plan as well as each of the alternatives were studied for environmental, social and economic effects, and engineering feasibility.

Accordingly, I recommend that the existing project for recreational boating and commercial fishing at the East Boat Basin in Sandwich, Massachusetts, originally constructed under authority provided for the widening of the Cape Cod Canal, and most recently modified in 1963 under authority of resolutions adopted by the committees on Public Works of the United States Senate and the House of Representatives dated March 12, 1949 and July 6, 1949, respectively, be modified through implementation of a Federal navigation project in accordance with the plan selected herein. Further modification of the selected plan may be made at the discretion of the Chief of Engineers as may be advisable. The total first cost of the Federal project is presently estimated at \$7,746,000, with negligible operation and maintenance costs expected.

I further recommend that cost-sharing of the Federal navigation project be in accordance with traditional policies. The estimated project first cost of \$7,746,000 would be apportioned 19.5 percent Federal and 80.5 percent non-Federal, or \$1,512,000 and \$6,234,000, respectively, in current dollars.

This recommendation is made subject to compliance with items of local responsibility by local interests as stated in the Plan Implementation section, and to cost-sharing and financing arrangements that are satisfactory to the President and the Congress.

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

Acknowledgement and Identification of Personnel

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3. The following New England Division personnel and support groups provided input and support for the study:

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Word Processing Center - report typing
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Real Estate Division

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ENVIRONMENTAL ASSESSMENT

AND

FINDING OF NO SIGNIFICANT IMPACT

EAST BOAT BASIN

CAPE COD CANAL

SANDWICH, MASSACHUSETTS

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASSACHUSETTS

DECEMBER 1983

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

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I. Introduction

This environmental assessment identifies and addresses potential impacts on the environment, both adverse and beneficial, that would be attributable to the proposed navigation improvement project at the East Boat Basin in Sandwich, Massachusetts, and considers alternatives to this proposed action.

Local interests have recognized that existing conditions at the basin do not meet present and future needs of the commercial fishing and recreational boating activities in the area. Therefore, they have proposed expansion of the basin to provide the additional facilities necessary to address present problems and to foster new growth of marine-related activities. As a first step towards realization of a basin expansion project, local interests requested that the Federal Government determine if it could participate in such a project. The request resulted in a Congressional resolution authorizing Federal study of the proposed project. The study was subsequently initiated in July 1980, and culminates with the preparation of a Feasibility Report which includes this Environmental Assessment.

Background information for this assessment has been obtained through coordination with local, State and Federal agencies, and others, and a search of both published and unpublished literature. The assessment is followed by a Finding of No Significant Impact (FONSI).

II. The Study Area

The East Boat Basin is a small harbor located along the south side of the Cape Cod Canal in Sandwich, Massachusetts (See Figure 1 in the main body). The basin was originally constructed in the late 1930's as part of the canal-widening project performed by the Corps of Engineers. Based on increased use of the basin during the 1950's by commercial fishing and recreational boating interests, the original basin was expanded to its present size in 1963.

The basin is part of the overall Cape Cod Canal navigation and recreation system that is owned and operated by the Corps of Engineers. This region provides many recreational opportunities for a large portion of southeastern Massachusetts and lower Cape Cod. Sandwich itself greatly expands in population during the summer due to an influx of summer residents and tourists. The excellent location of the East Boat Basin, just inside the eastern end of the canal, provides the only reasonable access point to Cape Cod Bay for recreational boating, within a 10 mile radius. In addition to recreational boating, camping, picnicking, hiking, fishing, cycling, and sightseeing are other popular activities that take place in the area.

Although a large portion of Sandwich's economy is based on leisure time activities, industry supports it also. The predominant industries

include electric power generation at the Canal Electric powerplant, and the commercial fishing industry along the Sandwich Bulkhead located just outside the East Boat Basin. Sandwich is the fifth largest fishing port in Massachusetts in terms of pounds of fish landed, realizing a throughput of 14 to 20 million pounds annually. Most of the fish are presently landed by transient vessels that transit the Cape Cod Canal, indicating that Sandwich is a very desirable location from which to operate a fishing fleet.

III. Need for the Action

The East Boat Basin presently provides space to berth about 80 recreational boats in a marina, and about 40 small (20' -70') fishing craft that moor in a raft formation from the one available pier, and also from the shore. Other facilities in the area include a boat launch ramp, recreational areas, parking areas and four fish offloading houses along the bulkhead outside the basin.

Demand for use of the basin has increased to a point that depth and area dimensions have become inadequate. The basin is presently being utilized to an extent that crowded conditions are a problem. The problem is well understood by the local interests, and therefore they desire to expand the basin. Implementation of the proposed project would provide an excellent opportunity to address the present problem and develop the East Boat Basin into a full service port for the region.

IV. Project Description

The proposed expansion project involves the excavation and dredging of a landcut to provide additional harbor area. The landcut would extend southward from the existing basin into a 22 acre parcel of land owned by the town of Sandwich. The selected plan (Plan C), shown on Figure 13 of the main body, would provide an additional 9.9 acres of water area comprised of a 4.5 acre commercial berthing area, 12 feet deep; a 1.8 acre recreational berthing area, 8 feet deep; a 450-foot by 160-foot turning/maneuvering area, 14 feet deep; a 670-foot by 30-foot offloading area, 14 feet deep; and a 120-foot wide entrance channel at a depth of 14 feet. In addition to the landcut, dredging would be performed in the existing basin including construction of an entrance channel 180 feet wide at the basin entrance narrowing to a 120-foot width inside the basin, and dredging the present 8-foot deep area on the east side to a depth of 12 feet. The basin expansion perimeter would be protected by riprap stone protection, with bulkhead used in and around offloading areas to facilitate anticipated fish offloading operations. In order to provide the proposed entrance channel width at the basin entrance, the east side would be modified using bulkhead to replace the present riprap.

The total area to be taken up by the expansion of the basin would be about 12 acres, including 2.1 acres of area required for riprap slopes. Total amount of material to be removed would be 534,470 cubic yards, which

includes about 29,550 cubic yards of dredged material. The project would realize a 52 vessel increase in the commercial fishing fleet, and a 15 boat increase in pleasure craft capacity. The construction of the East Boat Basin expansion would be expected to take about two years.

The project material would be removed by a dipper or bucket dredge working southward from the East Boat Basin, after dredging existing basin areas. Material would be placed in scows for dumping at the Foul Area ocean disposal site located about 50 miles to the northeast in Massachusetts Bay.

V. Affected Environment

A. At the Project Site

1. Topography and Geology - The terrain surrounding the Cape Cod Canal consists of rolling hills; the highest is 177 feet above mean sea level. The soil is predominantly sandy with rocks and stones, and the area is well forested.

The site of the East Boat Basin expansion is generally flat and largely covered with fill from the initial expansion of the basin and the construction of the nearby power plant. Since Cape Cod was formed during the last advance of the continental ice sheet more than 10,000 years ago, the natural soils at the site are outwash and glacial lake deposits. Upper portions of the soil profile are predominantly glacial outwash silts, sands and gravels overlying layers of peat, clay, and silt deposits. The deeper soils are highly overconsolidated, probably due to a readvance of the ice sheet after deposition.

2. Climatology - The Cape Cod climate offers very comfortable spring, summer and autumn temperatures. The winters are cold, often with subfreezing readings. At all seasons, however, the climate is more moderate than at nearby inland locations. The average January and July temperatures at the East Wareham Weather Station are about 29°F and 71°F, respectively. Extreme temperatures have been recorded at -24°F and 99°F. Precipitation is well distributed throughout the year and averages about 47 inches.

3. Aquatic Ecosystem - The Cape Cod Canal waters are designated as SB quality, which means they are "suitable for bathing and recreational purposes including water contact sports; industrial cooling; excellent fish habitat; good aesthetic value; and suitable for certain shell fisheries with depuration."

The canal is one of the most prolific and fruitful sport fisheries in New England. It offers many different types of fish, with the most common, in terms of catch, being Atlantic cod (Gadus morhua), Atlantic mackerel (Scomber scombrus), winter flounder (Pseudopleuronectes americanus), pollock (Pollachius virens) and tautog (Tautoga onitis).

Other species caught include striped bass (Morone saxatilis), bluefish (Pomatomus saltatrix), rainbow smelt (Osmerus mordax), chub mackerel (Scomber japonicus), blue runner (Caranx crysos), Atlantic tomcod (Migrogadus tomcod), red hake (Urophycis chuss) and American eel (Anguilla rostrata).

Fairly abundant fish with little or no commercial or sport fishing value are cunner (Tautoglabrus adspersus), Atlantic silverside (Menidia menidia), rock gunnel (Pholis gunnellus), longhorn sculpin (Myoxocephalus octodecemspinosus) and grubby (Myoxocephalus aeneus).

Alewives (Alosa pseudoharengus) gather during April, May, and June at the Bournedale Herring Run, several miles west of the boat basin. Schools of juvenile clupeid fish, including Atlantic herring (Clupea harengus harengus) and Atlantic menhaden (Brevoortia tyrannus) are present in the canal during late summer and early fall.

The Cape Cod Canal contains a diversified population of benthic flora and fauna with representatives of both the Cape Cod Bay and Buzzards Bay waters. Sampling conducted in the late 1960's found approximately 100 species of invertebrates, 26 species of algae and one flower macrophyte in areas of the canal. The primary difference from one end of the canal to the other is abundance rather than species composition, with decreasing numbers from west to east corresponding to the transition from a more rocky bottom at Buzzards Bay to a more sandy, gravelly substrate to the east. The canal waters do not contain a large shellfish population.

4. Terrestrial Ecosystem - The site of the proposed East Boat Basin expansion is generally covered with grasses and bushes. Northern bayberry (Myrica pensylvanica) is common. Near the center of the site a small open wet area is surrounded by phragmites (Phragmites communis) and a narrow ring of saltmarsh cordgrass (Spartina alterniflora). It is doubtful that the site contains any significant wildlife habitat or value.

5. Threatened and Endangered Species - There are no known threatened or endangered species of plants or animals inhabiting the waters of the current East Boat Basin or the area of the proposed East Boat Basin expansion.

6. Historic and Archaeological Resources - The area of proposed harbor improvement is currently fill land deposited during initial dredging of the basin in the late 1930's and during expansion in 1963. Surface elevation prior to that time appears to have been at near sea level and the area was probably wetland with low potential for presence of archaeological or historic resources.

7. Socioeconomic Resources - The population of Sandwich has grown at a rapid rate far in excess of the rate experienced in Massachusetts. The rapid growth witnessed in Sandwich has been evident throughout Barnstable County as well. In 1980, Sandwich's year-round

population was 8,727. This population more than doubles with the influx of the summer population.

Sandwich's economy is dependent on the seasonal activity which peaks in July and August. The trade and services sectors are the two largest employers in both the town and the county. Unemployment is a major problem facing the labor force because of the seasonal fluctuation of economic activity. Unemployment peaks during the winter months and on an annual basis generally exists at a higher level than State and national averages.

Census figures indicate that over 90 percent of year-round housing units in Sandwich are single family structures. Planning Commission data indicates that approximately 70 percent of all Sandwich's housing is used on a year-round basis. The majority of recent construction has been in year-round housing units, a trend expected to continue.

Residential use comprises the largest share of developed land, although the majority of Sandwich remains in an undeveloped natural wilderness state. A third of Sandwich's land, however, is controlled by the Federal Government at Camp Edwards and Otis Air Force Base.

8. Recreation - The East Boat Basin is a very popular location on the Cape Cod Canal for public recreation. The marina provides berths for recreational boating in a facility operated by the town of Sandwich. The commercial fishing operations at the boat basin and at four adjacent fish packing plants is a strong attraction to the visiting public, especially the many tourists who come to Cape Cod for its nautical atmosphere. The basin is the second busiest commercial fishing port on Cape Cod and the fifth busiest in Massachusetts. Public day use areas are provided by the Corps at both the east and west sides of the entrance to the boat basin. The east recreation area includes a comfort station, picnic tables and a paved parking area for 73 vehicles. The bulkhead provides convenient access to the canal edge for fishing and sightseeing. The west recreation area includes a comfort station, a few picnic tables and parking for 64 vehicles. The bicycle path along the canal's southern service road, extending over 6 miles from the railroad bridge over the canal, terminates at this parking area.

Sightseeing is the most popular activity at the basin, followed by fishing, hiking, jogging, picnicking and bicycling. Fishing is permitted in the canal but not in the basin itself.

Visitation to the basin area totals over 400,000 annually. Only the Herring Run in Bourne on Route 6 has more visitation on the canal.

B. At the Selected Disposal Site - The Foul Area

1. General - The Foul Area is one of three EPA-approved ocean disposal sites in the New England region. This area presently has an

indefinite interim designation status pending the development of an EIS for final designation. The site is located in Massachusetts Bay approximately 50 nautical miles northeast of the Cape Cod Canal. It is a circular area with a diameter of two nautical miles centered at 42° 25.7'N, 70° 34.0'W as shown on Figure EA-1. The general area has a history of being used for the disposal of various industrial wastes and dredged material. The currently designated site is available only for the disposal of dredged material that is found to be in compliance with EPA's Ocean Dumping Criteria (Section 102, 40 CFR 227). The most recent use of this site was for Federal and private maintenance dredging during 1982 and 1983 in the Boston Harbor area in which approximately 1 million cubic yards of material was dumped.

2. Physical and Chemical Characteristics - Physiographically, the site lies within the Stellwagen Basin, an elongate depression over 20 miles in length with a northwest-southeast trend. The dump site is situated in a 300-foot deep depression which is separated from the Stellwagen Bank area on the east by a 200-foot high slope. Surveys performed by the New England Aquarium (NEA, 1975) and the Naval Underwater Systems Center (NUSC, 1978) identify the natural bottom of the Foul Area as being rather flat and featureless. Bathymetric surveys have disclosed a variety of disposed objects including sunken vessels, munitions, concrete casings, metal drums and other debris along with dumped harbor sediments scattered throughout the general area. No investigations have detected any significant accumulation of spoil material in the area. However, a study of an actual dumping operation at the Foul Area, by NEA, observed that a significant portion of the discharged dredged material settled rapidly to the bottom and remained in place.

Water - Bottom currents in the vicinity of the Foul Area have been investigated by NEA and others. The NEA study, performed in 1973 and 1974, recorded bottom currents of no greater than 17 cm/sec (.3 knots) with most velocities measured as being less than 10 cm/sec (0.2 knots). This indicates that currents are low and insufficient for any significant spoil dispersal. There is some question as to the extent of the effect of tidal forces on the bottom currents at the Foul Area. The NEA study concluded that the direction of bottom currents are variable depending on the season with general trends as follows:

Winter - SE	Summer - W
Spring - S or W	Fall - N

The water temperature profile at the Foul Area has also been investigated by NEA. The water column is relatively isothermal during the spring with the temperature varying between 3.7 and 4.8°C. However, it is apparent that a thermocline begins to develop in May and reaches a peak by mid-summer. At that time the near-surface water has been recorded at 19°C and the near-bottom at approximately 5.5°C. Various depth measurements indicate that a majority of the thermocline may occur between 10 and 30 feet below the water surface.

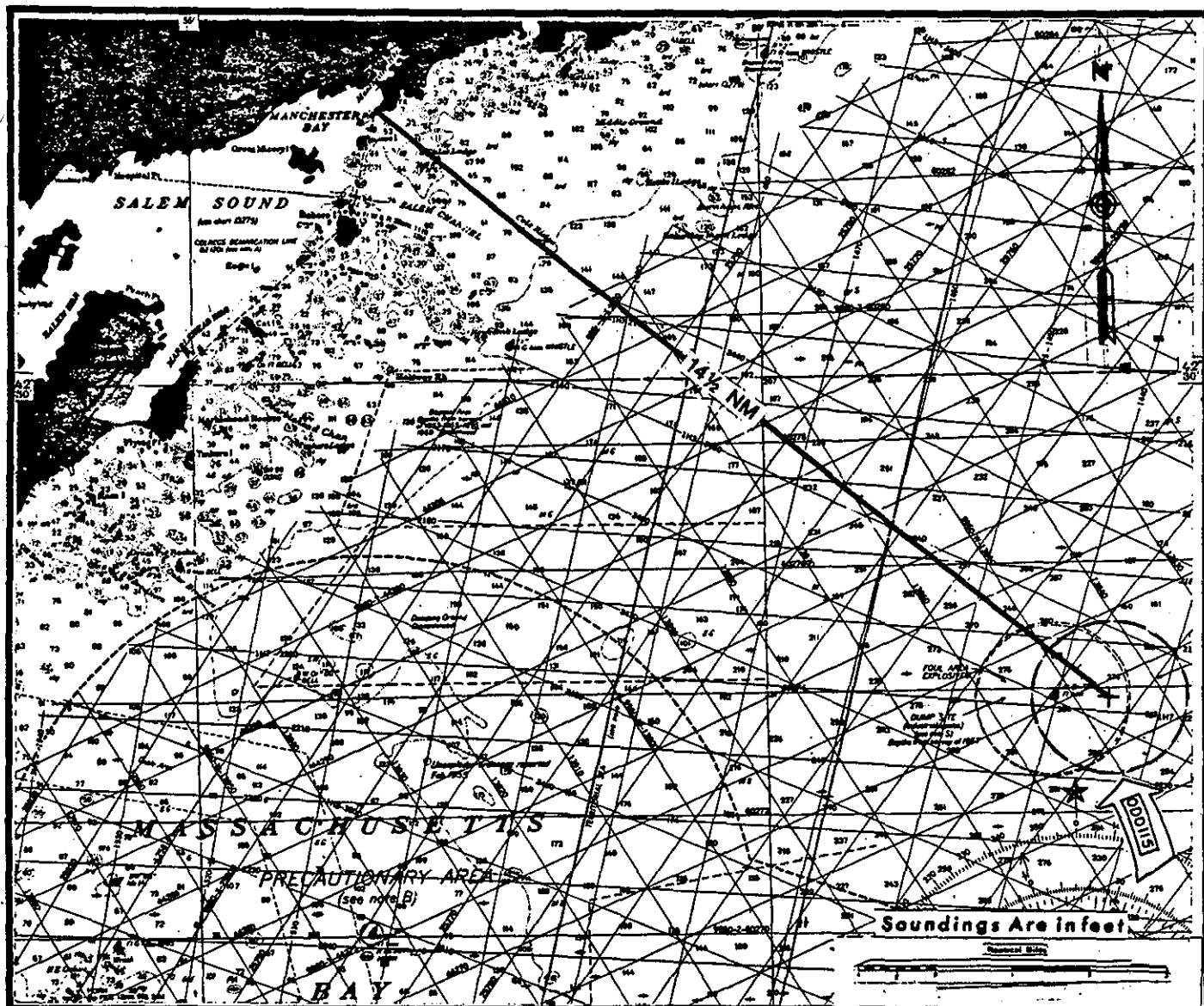


Figure EA-1 FOUL AREA, MASS. BAY

EPA 000115: FOUL AREA

DEPTH RANGE: 159 TO 304 FEET MLW

CENTER COORDINATES: 42°-25.7'N, 70°-34.0'W

DESCRIPTION: THIS EPA APPROVED INTERIM SITE IS A CIRCULAR AREA WITH A DIAMETER OF 2 NAUTICAL MILES AND CENTER AT 42°-25.7'N, 70°-34.0'W. FROM THE CENTER, THE MARBLEHEAD TOWER BEARS TRUE 282° AT 24,300 YARDS AND BAKERS ISLAND HORN BEARS TRUE 300° AT 24,300 YARDS.

N.O.S. CHART: 13267

DATE: 20 DECEMBER 1980

The background salinity for the area is approximately 32 ppt. Available data shows little change during the fall and winter, but a decline during the spring. It has been suggested that this may result from fresh water input from the Merrimack River. Dissolved oxygen levels are found to be influenced by the various periods of primary production and plankton die-off. The lowest concentration was noted to be 6.8 mg/l at the surface during April. The fall decline throughout the water column is attributed to increased levels of respiration while the influence of the spring and summer blooms are evident. During the summer, oxygen levels have been noted to be above saturation at some locations. The nutrient relationships also reflect the influence of phytoplankton growth and die-off, particularly as the level of phosphorus declines sharply and the nutrient becomes limiting in the trophogenic zone. There are rising concentrations of nutrient material during the summer below the thermocline. Increased concentrations of ammonia have been found near the bottom during disposal of dredged material. Average annual nutrient levels for the Foul Area waters are indicated in Table EA-1, together with average annual metal levels.

With the exception of periods during which dredged material was being dumped, trace metal levels generally have been at relatively low levels. Lead, however, reflects some seasonality, and some differences in the concentrations of other metals are detected between stations and at certain depths.

Table EA-1

Foul Area Water Quality

<u>Parameters</u>	<u>Annual Mean Concentrations ppm</u>
Nitrate N	104
Nitrite N	3.3
Ammonia N	44
Ortho Phosphate	25
Lead	2.3
Zinc	21
Cadmium	0.32
Chromium	0.4
Copper	2.3
Nickel	2.8

Data from New England Aquarium (1975)

Sediments - Sediments in the Foul Area are primarily composed of fine-grained silts and clays with some sand, gravel and other glacial deposits in the northeast portion of the area. Acoustic profiling of the areas in Stellwagen Basin at the Foul Area proper indicates that thick deposits of recently deposited sediments are accumulating in the basin. It is thought that the basin is a natural sediment sink for fine-grained

terrigenous sediments from the Massachusetts coast, perhaps from as far away as the Merrimack River.

Chemical properties of the Foul Area sediments have been investigated by NEA (1975), NUSC (1978) and SAI (1982). There are some variations in constituent concentrations among the several sites sampled but the differences are not considered to be significant. The variations are attributable to different dredged materials dumped in the area. Table EA-2 presents average sediment concentrations at the Foul Area, East Boat Basin and various Federal project harbors within the Gulf of Maine tidal system. Comparison of the data shows the Foul Area sediments to be reasonably consistent with the mean values for various harbors throughout the tidal system. This is expected since the dumpsite has been used for disposal of material dredged from many of the harbors. Oil and grease and copper are two constituents found considerably lower in the Foul Area sediments relative to the harbor averages.

Table EA-2

Comparison of Sediment Quality

	<u>Composite of East Boat Basin Sediments/Materials</u>		<u>Foul Area Sediments</u>			<u>Various Harbors Throughout the Gulf of Maine Tidal System 1969 to 1980</u>	
	<u>(dredge area)</u>	<u>(excavation area)</u>	<u>NEA Composite (1975)</u>	<u>NUSC/DAMOS (1978)</u>	<u>SAI/DAMOS (1982)</u>	<u>mean</u>	<u>mean plus one SD</u>
Soil Description	organic silty clay and sand	medium/fine sand	silty clay	-	sandy silty clay		
% Vol Solids	3.2	.93	7.62	17.65	4.34	4.37	9.36
Oil & Grease	901.8	< .41	940	ND	-	2532	6361
Mercury	< .07	< .08	0.59	.24	.14	.57	1.78
Lead	< .65	< .30	60.94	52	94	83.2	184
Zinc	117.3	95.7	140.44	92.5	208.6	134.5	285.5
Arsenic	7.2	< 2.05	13.25	-	13.14	6.98	14.64
Cadmium	< 3	< 3	3.43	.44	ND	3.12	9.37
Chromium	< 59	< 30	73.75	87	43.9	112	337.4
Copper	34	< 10	21.13	21.4	40.7	83.2	212.6
Nickel	< 40	< 40	37.56	33.5	31.3	36.3	64
Vanadium	< 200	< 200	53.69	-	ND	60.9	119.8
PCB's	< .005	< .005	.052	-	ND	.61	1.65

All concentrations, except for volatile solids, are expressed in ppm.

ND denotes concentrations below laboratory detection limits.

Sediment concentrations at the Foul Area are considerably higher compared to the East Boat Basin project test data. The uncontaminated nature of the boat basin material is attributed to its predominantly granular nature and the lack of any significant sources of pollution as explained in detail in Appendix 1.

3. Aquatic Resources -

Benthos - Biological data on the Foul Area has been collected in a major effort by NEA (see Table EA-3). In addition, the Naval Underwater Systems Center (NUSC) and Science Applications Inc. (SAI) collected data for NED's Disposal Area Monitoring System (DAMOS) during three separate single-day samplings (See Tables EA-4, EA-5, and EA-6). Benthic samples collected show there to be high diversity but low numbers of individuals present. Since dredged material disposal has been a continuing activity in this area the types and quantities of organisms found represent a disturbed but functioning benthic community. The most dominant organisms are the polychaete worms, Spio filicornis, Heteromastus filiformis, Ninoe nigripes and Sternaspis scutata. In addition to polychaetes, various mollusks, shrimp and starfish have been found to inhabit the dumpsite area, but in smaller numbers. The types of organisms observed at the Foul Area are similar but less in number than other nearby areas (NEA, 1975 and NUSC 1978).

Table EA-3

Benthic Species Recovered at the Foul Area, (NEA, 1975)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Priapulida																								
Priapula caudatus																					2			
Sipunculoidea																								
Golfingia sp.	5	8							9	55	9		8	3			11		8		10	9	4	
Phascolion strombi															2								1	
Nemertea																								
Micrura albida																	1					1		1
Nemertine sp.																								
Mollusca																								
Gastropoda																								
Acmaea testudinalis*					1																			
Admete couthouyi*				1																				
Buccinum undatum*				1	1	1	6						1	1		1						1		
Colus pygmaeus*																	1							
Crepidula convexa*				1	1		5																	
Hydrobia minuta*																								5
Littorina obtusata*																								1
Mitrella lunata*					5		9																	
Nassarius trivittatus*					1		5	1																
Polinicies immaculata							2					1												
Retusa obtusa*							3	1																
Scaphander punctostriata*																							2	
Triphora perversa																								
nigrocincta*				1	3		28	1																
Turbonilla interrupta*					1		6	6																
Urosalpinx cinera*								2																

*No living representatives of these species were recovered.

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mollusca																								
Pelecypoda																								
Anomia simplex*							2				1				1									
Astarte quadrans*			1																					
Astarte undata			3	1			1									25	1							
Cerastoderma pinnulatum				1						1		1				18		1	7	1				
Crassostrea virginica*								3																
Crenella faba*																1								
Crenella glandula*																3								
Gemma gemma*								8																
Hiatella arctica															1									
Hiatella striata																		2						
Kellia suborbicularis*								11																
Macoma balthica*			1								1											3	1	
Macoma calcarea		1	2	2			5	6			1			1	5		1		3					
Mulinia lateralis*								2																
Mya arenaria*					+	+	+	9		+											2	1	1	
Mytilus edulis*					+	+	+	4		+								+						
Nucula tenvis			9	3				2								2	9		1		2		1	
Nuculana pernula			1							1						2						1		
Pitar morrhuana*							1															1		
Placopecten magellanicus*																1								
Thyasira sp.	4	2	2	18		2	6	5	2		38	19	1		23	7		4		15		4	7	9
Venericardia borealis																5								
Yoldia inflata*											1	3					1		2				1	
Yoldia iris				2			1					2	1		1			1				1		
Yoldia lucida*									1		1		1									2		
Yoldia subangulata*	1						1					1										2	1	

+Denotes shell fragments.

Table EA-3 (Continued)

	North				Center				South				East				West				Control				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Annelida																									
Ammotrypane aulogaster	1									1				1						1					
Ancystrocyllis groenlandicus												2							1					1	
Apisthobranchus tullbergi											1														
Aricidea quadrilobata	1								1		15			2						3		6	16	4	
Capitella sp.		1		6					2			3		1						2			2	3	
Chaetozone setosa	9	5		4					15	79	3		7	1				3		8		17	49	22	
Ephesiella minuta																		1							
Eteone longa	1	1		1							1									2			1		
Eteone trilineata																		1		1					
Euchone rubrocincta										1						1									
Eunice sp.																1									
Glycera sp.																1									
Goniada maculata		3								1	1	1						3	1		1			7	
Harmathoe imbricata	1															1							1		
Heteromastus filiformis	11	22		19		4			6	8	32	12		17	4			6	7	12		7	4	63	8
Lumbrineris fragilis	2										1									2			1	2	
Lumbrineris latreilli																				1					
Magelona sp.												1													
Maldane sarsi				1					1			1				1									
Nepthys buccera						1	1			1		1										1		1	
Nepthys incisa	1	2									1											1		2	
Nicomache lumbricalis											1	1								5			2	2	
Ninoe nigripes			1	1					1	2	1	2						1	1			1		2	
Ninoe sp.	1																								
Pectinaria sp.				3	1											4		1	9						
Phloe minuta				1						1						2			1			1		4	
Polydora concharum																1									
Praxillella praetermissa			1																	1			1		
Prionospio sp.	6	7		3					10	2	18	7	1	5	4	2			3	13	1	17	11	21	
Scoloplos acutus	1			1					1	2	2	8	1	1		1				14			1	5	
Scoloplos armiger																							1		
Spio filicornis		3		8		11					4	57	12		7	18	98		23	38	29		2	148	178

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Annelida, cont.																								
<i>Stauronereis caeca</i>													1								1		1	
<i>Sternaspis scutata</i>	3	3		1							2			3					1		1			
<i>Terebellides stroemi</i>																						1		
<i>Tharyx</i> sp. A									1										1					
<i>Tharyx</i> sp. B										1														
Arthropoda																								
<i>Ampelisca macrocephala</i>																	1						1	
<i>Ampithoe rubricata</i>																1								
<i>Anonyx lilljeborgi</i>													1											
<i>Balanus balanoides</i> *						2	+	+							1+	+			+					
<i>Eudorella emarginata</i>				1							3													
<i>Eudorella truncatula</i>															1									
<i>Harpinia propinqua</i>		1									2									1		6	2	2
Echinodermata																								
<i>Ctenodiscus crispatus</i>									1		2												6	
<i>Molpadia</i> sp.									1			1	1											
Number of Individuals	48	59	21	81	16	3	97	68	51	25	321	94	9	52	66	181	13	57	77	131	13	75	338	284
Number of Species	15	13	9	23	11	5	21	17	13	14	27	22	9	12	13	24	5	13	14	24	6	15	30	25

Table EA-4

Foul Area - DAMOS Benthos (NUSC, 1979)

DATE: 18 DECEMBER 1977

PREDOMINANT SPECIES	DREDGE NUMBER				TOTAL	MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL. % OF TOTAL
	#1	#2	#3									
1. <i>Ninoe nigripes</i>	7	11	8	26	8.7	2.1	0.5	3.5-13.9	1	14.5	14.5	
2. <i>Sternaspis scutata</i>	0	8	15	23	7.7	7.5	7.3	0-26.3	2	12.8	27.3	
3. <i>Praxillella gracilis</i>	0	7	7	14	4.7	4.0	3.4	0-14.6	3	7.8	35.1	
4. <i>Molpadia oolitica</i>	0	5	6	11	3.7	3.2	2.8	0-11.7	4	6.1	41.2	
5. <i>Lumbrineris tenuis</i>	1	7	2	10	3.3	3.2	3.2	0-11.3	5	5.6	46.8	
6. <i>Myriodula heeri</i>	0	5	4	9	3.0	2.6	2.3	0-9.5	6	5.0	51.8	
7. <i>Yoldia lucida</i>	0	7	2	9	3.0	3.6	4.3	0-11.9	6	5.0	56.8	
8. <i>Scoloplos acutus</i>	0	6	2	8	2.7	3.1	3.6	0-10.4	7	4.5	61.3	
9. <i>Micrura</i> sp.	0	5	2	7	2.3	2.5	2.7	0-8.5	8	3.9	65.2	
10. <i>Ctenodiscus crispatus</i>	1	5	0	6	2.0	2.6	3.4	0-8.5	9	3.4	68.6	
11. <i>Goniada maculata</i>	2	3	0	5	1.7	1.5	1.3	0-5.4	10	2.8	71.4	
12. <i>Nucula tenuis</i>	0	2	2	4	1.3	1.2	1.1	0-4.3	11	2.2	73.6	
13. <i>Spio Filicornis</i>	1	2	1	4	1.3	0.6	0.3	0-2.8	11	2.2	75.8	
14. <i>Yoldia thraciaeformis</i>	0	2	2	4	1.3	1.2	1.1	0-4.3	11	2.2	78.0	
15. <i>Nephtys incisa</i>	1	2	0	3	1.0	1.0	1.0	0-3.5	12	1.7	79.7	
16. <i>Ophiura sarsi</i>	0	0	3	3	1.0	1.7	2.9	0-5.2	12	1.7	81.4	
TOTAL	13	77	56	146	48.7	32.6	21.9	0-129.7				
TOTAL NO. OF SPP PER DREDGE	9	31	20	39	20.0	11.0		0-47.3				
SPECIES DIVERSITY (H')	1.87	3.12	2.59	7.58	2.53	0.63						
EQUITABILITY (J')	0.85	0.91	0.87	2.63	0.88	0.03						

TOTAL NO. OF INDIVIDUALS THIS STATION = 179

Table EA-5

Foul Area - DAMOS Benthos (SAI, 1980)

Date: 6 December 1978

Predominant Species	Sample No.					Number of Individuals				95% Conf. Limits of Mean	Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	1	2	3	4	5	Total	Mean	Std. Dev.	Coeff. of Dispersion				
1. <i>Ninoe nigripes</i>	12	11	9	-	-	42	10.7	1.5	0.2	6.9 - 14.5	1	20.0	20.0
2. <i>Ampharete arctica</i>	12	5	8	-	-	25	8.3	3.5	1.5	0 - 17.1	2	11.9	31.9
3. <i>Lumbrineris fragilis</i>	4	9	12	-	-	25	8.3	4.0	1.9	0 - 18.4	2	11.9	43.8
4. Cirratulid sp.	17	0	0	-	-	17	5.7	9.8	16.8	0 - 30.1	3	8.1	51.9
5. <i>Thyasira insignis</i>	4	10	0	-	-	14	4.7	5.0	5.3	0 - 17.2	4	6.7	58.6
6. <i>Yoldia sapotilla</i>	8	4	1	-	-	13	4.3	3.5	2.8	0 - 13.1	5	6.2	64.8
7. <i>Micrura</i> sp.	7	3	2	-	-	12	4.0	2.6	1.7	0 - 10.6	6	5.7	70.5
8. <i>Scoloplos acutus</i>	8	1	1	-	-	10	3.3	4.0	4.8	0 - 13.4	7	4.8	75.3
9. <i>Goniada maculata</i>	0	2	6	-	-	8	2.7	3.1	3.6	0 - 10.3	8	3.8	79.1
10. <i>Tharyx acutus</i>	0	3	5	-	-	8	2.7	2.5	2.3	0 - 8.9	8	3.8	82.9
11. <i>Spio filicornis</i>	3	1	2	-	-	6	2.0	1.0	0.5	0 - 4.5	9	2.9	85.8
12. <i>Melinna cristata</i>	1	0	4	-	-	5	1.7	2.1	2.6	0 - 6.8	10	2.4	88.2
13. <i>Laonice cirrata</i>	0	3	1	-	-	4	1.3	1.5	1.7	0 - 5.1	11	1.9	90.1

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H')	2.54	2.44	2.58	-	-	2.52	0.07
Equitability (J')	0.82	0.86	0.86	-	-	0.85	0.02

Table EA-6

Foul Area - DAMOS Benthos (SAI, 1980)

Date: 6 June 1979

Predominant Species	Sample No.					Number of Individuals				95% Conf. Limits of Mean	Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	1	2	3	4	5	Total	Mean	Std. Dev.	Coeff. of Dispersion				
1. <i>Spio filicornis</i>	31	57	55	58	147	348	69.6	44.7	28.7	14.1 - 125.1	1	54.8	54.8
2. <i>Heteromastus filiformis</i>	9	8	10	18	2	47	9.4	5.7	3.5	2.3 - 16.5	2	7.4	62.2
3. <i>Chaetozone setosa</i>	1	2	5	5	7	20	4.0	2.4	1.4	1.0 - 7.0	3	3.1	65.3
4. <i>Trochochaeta multisetosa</i>	0	3	1	2	11	17	3.4	4.4	5.7	0 - 8.9	4	2.7	68.0
5. <i>Ninoe nigripes</i>	7	1	3	1	4	16	3.2	2.5	2.0	0.1 - 6.3	5	2.5	70.5
6. <i>Micrura</i> sp.	6	3	3	2	1	15	3.0	1.9	1.2	0.7 - 5.3	6	2.4	72.9
9. <i>Prionospio malmgreni</i>	2	3	2	3	3	13	2.6	0.5	0.1	1.9 - 3.3	7	2.0	74.9
8. <i>Scoloplos acutus</i>	1	0	6	2	3	12	2.4	2.3	2.2	0 - 5.3	8	1.9	76.8

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H'):	2.32	1.96	2.18	2.36	1.37	2.04	0.41
Equitability (J'):	0.75	0.63	0.65	0.70	0.42	0.63	0.13

Because of its disturbed condition, the Foul Area is not felt to contribute significantly to the overall productivity of Massachusetts Bay.

Fisheries - Stellwagen Basin supports food and spawning habitat for a variety of marine fisheries which are utilized by commercial and recreational interests. Data from trawls in the area indicate that the dominant species are Atlantic cod (Gadus morhua), haddock (Melanogrammus aeglefinus), winter flounder (Pseudopleuronectes americanus) and little skate (Raja erinacea) (National Marine Fisheries Service, personal communication). Other important species include yellowtail flounder (Limanda ferruginea), silver hake (Merluccius bilinearis), American plaice (Hippoglossoides platessoides), and pollock (Pollachius virens). The entire area within the Foul Area dumpsite is closed to both ground fishing and shellfishing (per Federal Food and Drug Administration, personal communication). However, there are no fishing restrictions outside the dumpsite proper.

4. Threatened and Endangered Species - Data from an annual report prepared for the Bureau of Land Management indicates that Stellwagen Bank (east of the Foul Area) is used by two species of turtles and three species of whales (URI, 1981).

The leatherback turtle (Dermochelys coriacea) and the loggerhead turtle (Caretta caretta) are designated by the National Marine Fisheries Service (NMFS) as endangered and threatened, respectively. Although sightings of both species have been documented in Massachusetts Bay, the loggerhead is more commonly found to the south of the Bay while the leatherback is more common east and south of the bay area. The disposal site area is not commonly used by these species. Sightings of a third species of turtle, the Kemp's ridley (Lepidochelys kempi), which is designated as endangered, have also been recorded in the past but this species prefers shallow water inshore areas (Cape Cod) and does not use the outer Massachusetts Bay for feeding (NMFS, personal communication).

All three species of whales, the humpback, (Megaptera novaengliae), the finback whale (Baleanoptera physalus), and the right whale (Eubalaena glacialis) are designated as endangered. The right whale is more commonly found east and south of the area and is not considered a potential heavy user of the disposal site area. NMFS has indicated that the Stellwagen Bank area is extensively used as a feeding ground by the humpback and finback whales from May through October. Therefore, the latter two species are of concern and will be discussed below.

It has been estimated that there are approximately 2,000 humpback whales in the northwest Atlantic Ocean. Based on studies by the University of Rhode Island (URI) (1981) for the year 1979, at least 600 of this population use the Stellwagen Bank area for feeding and nursing of calves from May through the fall. The movements of these animals are thought to be closely associated with their primary food species, the sand lance (Ammodytes americanus), which has suitable habitat in the clean sand and waters above the Stellwagen Bank (Kenney, et al., 1981).

There are an estimated 3,600-6,300 finback whales in the northern Atlantic Ocean. The URI study indicates that 1,100 individuals are in the Massachusetts Bay area. This species is found in other areas of the bay (eg., Jeffrey's Ledge off Cape Cod) more commonly than the humpback whale. It, therefore, is not as exclusive a user of the Stellwagen area as the humpback. This may be associated with its wider variety of preferred food species which include krill, capelin, squid, herring, and lanternfish (Leatherwood, et al., 1976)

Sightings of both species based on available data derived from (1) the URI report for the year 1979 and (2) the 1981 data compiled by Mr. Weinrich, Principal Investigator for the Cetacean Research Unit Group. Sightings are generally concentrated 3-4 nautical miles (nm) east and northeast of the Foul Area. No sightings were within a 2 nm radius of the discharge point. The sightings are generally found in shallower water areas (associated with the northern extreme of Stellwagen Bank) where the schooling sand herring are more likely to be found.

5. Historic and Archaeological Resources - As the Foul Area has been repeatedly used for prior disposal, the existence of unimpacted or significant historic or archaeological resources is highly unlikely.

VI. Probable Impacts of the Proposed Action on the Environment

A. Introduction

Construction-related impacts as well as those pertaining to the operation of the improved East Boat Basin can be expected. These would be of both a short-term and long-term nature. Impacts would occur at both the site of the project and its environs and at the disposal location of the excavated and dredged materials, as well as along transportation routes to the disposal location.

B. At the Project Site

1. Aquatic Ecosystem - Short-term impacts of the dredging would include physical destruction of benthic habitats and organisms as well as those due to settling of sediments and temporarily increased turbidity in the basin. The dredging may also disturb and expose anaerobic bottom sediments, leading to some depletion of dissolved oxygen in these waters. Some hydrogen sulfide gas could also be liberated during dredging, possibly resulting in unpleasant odors. No significant long-term effects are anticipated. Recolonization of benthic organisms within the basin should occur soon after the cessation of the dredging operations. In fact, enlargement of the basin will provide a greater bottom area for the benthic community to develop. A secondary effect of the dredging (and expansion) of the basin may take place, however, due to the increased capacity of the upgraded facility. More boats could increase pollution potential within the cul-de-sac configuration of the basin.

2. Terrestrial Ecosystem - Expansion of the East Boat Basin should have minimal effect on local and regional terrestrial ecological resources. The site is primarily fill with no apparent significant wildlife habitat or value. The small wet area at the center of the site containing wetland grasses is not of any significance.

If the basin is expanded, the shoreline would reach further inland into areas that are less affected by salt water at present. The only concern of any significance during the earlier stages of this study had been over possible saltwater intrusion on town water supply wells in the area. However, the two water supply wells for the town of Sandwich near the basin were shut down over two years ago.

3. Threatened and Endangered Species - No threatened or endangered species of plants or animals are known to inhabit the waters of the current East Boat Basin or the area of the proposed East Boat Basin expansion.

4. Historic and Archaeological Resources - As the area is currently fill land atop a low-lying natural surface which appears to have been wetland prior to filling, significant archaeological or historic resources are highly unlikely and no project effects are anticipated upon such resources.

5. Socioeconomic Resources - The implementation of an expansion project at the East Boat Basin would result in some short-term and long-term impacts on the socioeconomic resources of the area.

Short-term effects would result from construction activities with an expected duration of 2 years. Construction activities would increase local air and noise pollution levels. Movement of excavated and dredged material by barge through the basin to the canal and into Cape Cod Bay would add to the basin's congestion and also impact traffic in the canal. However, it is expected that excavation and dredging activity will be limited during the busiest summer months.

The most significant long-term effect of the expansion project is alleviation of congested basin conditions and demands on the commercial and recreational opportunities. The Corps plan suggests separating the commercial and recreational fleets; placing the commercial vessels on the east side of the basin, and recreational boats on the west. This shift would result in reducing the without-project capacity by 40 recreational spaces. These boats, however, would be accommodated in the expansion area. Another element that is expected to be implemented by local interests would be the provision of dry storage for small recreational craft. Dry storage is an appealing element because it further reduces demands of recreational boating interests while only requiring a limited amount of water space for a dock. The town would be responsible for dredging the areas where slips would be placed, placement of slips, and provision and management of a dry storage facility.

Long-term effects on the commercial industry are realized through increased landings. These have been enumerated for each plan in the economic analysis. Commercial space in the expansion area would allow for a doubling of the commercial fleet. However, it is estimated that half of this new fleet would be transfers of boats from other ports.

The area surrounding the expanded area would provide the opportunity for development of facilities needed by the fishermen, including facilities to freeze and pack fish, repair boats and equipment and manufacture ice. There may be additional development to attract tourists and satisfy recreational boaters. The expansion, along with subsequent development, would provide numerous local benefits including increased berthing fees, property taxes on new pleasure boats, property taxes from new buildings, and fees from leased industrial land.

A comprehensive planning effort would be required by the town to promote appropriate development of the area and proper management of the facilities to assure that the basin's potential is reached.

Any on-land traffic problems that may result from expansion of the basin are expected to be minimal, according to the Town Engineer. Some traffic restrictions for the various roads entering the area could be considered, in order to prevent any conflict of activities. An example would be to allow only commercial fishing related traffic to use Gallo Road for access, and allow access to recreational areas via Freezer Road on the west and Coast Guard Road, which runs parallel to Gallo Road, further east. A service road would have to be maintained around the expansion in order to comply with Corps of Engineers requirements.

6. Recreation - Some inconvenience to recreational users may occur during construction, however, no significant negative long-term effect on recreation in the area is expected. The site to be excavated in the expansion is not currently used for recreation. The increased berthing facilities may in fact make the area more attractive to sightseers.

C. Disposal of Excavated and Dredged Material

As previously mentioned, the Foul Area is only available for the discharge of dredged material that has been found to be in compliance with EPA's Ocean Dumping criteria (U.S. EPA, 1977). The criteria specify certain restrictions and sediment testing that must be applied to material proposed to be dredged in determining the ecological acceptability of its disposal in ocean waters.

Subpart B (Environmental Impact) of these regulations contains the specific guidelines to be considered for determining compliance.

Part 227.5 prohibits ocean dumping high-level radioactive wastes; materials used for warfare; insufficiently described materials; or

persistent, inert substances that may interfere materially with legitimate uses of the ocean. The material to be dredged and excavated from the East Boat Basin area is not known to contain any of those substances. The material will be dumped within an area designated solely for that purpose and should not interfere with any other legitimate uses of the ocean.

Part 227.6 prohibits the ocean disposal of material containing mercury (Hg), cadmium (Cd) and organohalogens as well as their compounds, oil of any kind or any form and known or suspected carcinogens, mutagens or teratogens in greater than trace amounts. (These constituents are no more than trace amounts in the East Boat Basin material, see Appendix 1)

Part 227.13(b) of the ocean dumping criteria identifies certain dredged materials that may be excluded from further testing (bioassays) and allows the material to be considered environmentally acceptable for ocean dumping in the following instances:

1. Dredged material which is composed predominantly of sand, gravel, rock, or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy such as streams with large bed loads or coastal areas with shifting bars and channels, or

2. Dredged material which is for beach nourishment or restoration and is composed predominantly of sand, gravel or shell with particle sizes compatible with material on the receiving beaches; or

3. When: (i) the material proposed for dumping is substantially the same as the substrate at the proposed disposal site; and

- (ii) the site from which the material proposed for dumping is to be taken is far removed from known existing and historical sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

The material to be removed from the boat basin area has been tested and is considered to be uncontaminated and in compliance with the above exclusion criteria. The existence of point source discharges, including petroleum spills in the basin area, have been investigated (personal communications with the U.S. Coast Guard and Mass. Dept. of Water Pollution Control, May 1983). No spills of any significance have been reported since the sediment samples were taken. Point source discharges in the basin constitute primarily thermal discharges. No major point sources are known to exist in the basin area. Fish processing plants in the area discharge effluents solely into the canal waters. These are quickly diluted by strong currents. The remainder of facilities around the basin utilize ground leachate bed systems which filter effluents before they enter any waterbodies in the area.

EPA has informed us, by letter of 22 October 1982, that they consider the material to be removed from the East Boat Basin project to be suitable for ocean disposal.

Based on the above information and review of applicable criteria we feel that the material to be dredged and excavated from this project is within compliance and is environmentally acceptable for disposal at the Foul Area.

1. The Action of Disposal - The dredged material is released through bottom opening doors in the scows and deposited at the dump site. The movement of sediments through the water column has been extensively investigated. Immediately upon release from the scow the material generally descends rapidly to the bottom. The speed of descent and the size of bottom spreading depends on many factors, including the mechanical properties of the sediment, water content in the sediments, depth, bottom conditions, and ambient currents. Ambient current conditions are important since a large volume of disposal site water is involved during descent such that the material flow may acquire the ambient lateral velocity of the water. Upon impact, a turbidity (density driven) current could result which would spread outward until frictional forces cause it to stop. However, a majority of the East Boat Basin material is expected to descend rapidly to the bottom with minimal bottom spread due to its coarse nature.

2. Impacts on the Environment -

a. Water Quality - The only impacts on the water quality associated with the dredged material disposal could be a temporary and local increase in suspended solids and release of contaminants.

i. Turbidity - Release of the dredged material could introduce a turbidity plume of fine loose and clumped material into the water column. Studies performed during a disposal operation at the Foul Area by the New England Aquarium (1975) indicated that suspended solids were highest near the bottom of the water column. However, the levels of turbidity did not adversely affect primary production. Observations to date indicate that generally only 1-5% of the total volume of dredged material dumped in open water remain suspended in the water column after disposal. Since very little fine material will be associated with the East Boat Basin project, any turbidity generated by disposal should be localized to the immediate discharge area and be of short duration. There should be no measurable effects outside the dumpsite area.

ii Release of Contaminants - The material dredged and excavated from the project area and disposed at the Foul Area may result in some release of certain constituents to the water column during descent. Some release may also occur from the material after settling to the bottom. However, bulk chemical analyses on the material show it to contain relatively low levels of constituents of concern. Additionally,

elutriate analyses on material from Site E within the basin shows only ammonia, oil and grease and manganese to have a potential for release above ambient water concentrations within the basin. The values that do show release above ambient levels are well below EPA's water quality standards and should pose no significantly adverse effects on the marine environment. Mixing through the water column and by current flow at the dumpsite will dilute any releases and further reduce any contaminant concentrations to negligible levels.

b. Sediment Quality - As previously described, the sediments to be discharged at the Foul Area by this project have been tested and found to be predominantly coarse grained and uncontaminated. The site has been used for many years for disposal of large amounts of finer and more contaminated material. This has resulted in an increase in contaminants at the dumpsite, which has resulted in a degradation of sediment quality compared to other nearby areas that have not been used for disposal. The uncontaminated nature of the East Boat Basin material could actually improve the dumpsite sediment quality by covering more contaminated material already at the site. At worst, bottom conditions could remain the same.

c. Impacts on Organisms -

i. Physical Effects -

Turbidity - Any increased levels of suspended particulates during disposal operations will be minor, localized and short lived. The impacts of disposal on phytoplankton were monitored at the Foul Area during disposal operations in 1973 (Martin and Yentsch, 1973). The authors found no evidence to suggest that the natural seasonal fluctuations of phytoplankton were disturbed. The effects of turbidity on pelagic fishes at the time of disposal should be inconsequential since they would be able to easily avoid any temporary turbidity plumes. Polychaete worms, which have been found to constitute a majority of the benthic organisms at the dumpsite, are deposit feeders commonly associated with fine sediments. Their feeding activity results in a reworking of the sediments producing a layer of surface sediment that is easily resuspended by low velocity currents (Rhoads and Young, 1970). By this nature, these organisms normally live in extended periods of turbidity and should not be significantly affected by additional minor turbidity of short duration.

It is expected that filter feeding organisms such as bivalve molluscs would be more sensitive to increased suspended solids because of the nature of their feeding and respiratory mechanisms. However, review of available literature indicates that bivalves exhibit low mortality when exposed to increased suspended solids from dredging operations (Stern and Stickle, 1977). In addition, a report prepared for the Massachusetts Department of Natural Resources (1973) found filter feeders such as quahogs, soft-shelled clams, and Atlantic oysters were not affected by 48- and 96-hour sediment concentrations of 83.2 grams per liter. These values

simulate the effects of the worst case turbidity from dredging activities. The fortitude of these organisms can also be applied to turbidity at disposal sites. Therefore, it is concluded that significant harm to filter feeders at the Foul Area is not likely to occur.

Sedimentation - Sediments discharged from the scows at the dumpsite will bury any benthic organisms living in the impact area. Deep burrowing sediment feeding organisms will have a better chance of survival than non-motile or slow-moving epibenthic species. Burying of the more sensitive eggs, larvae and juvenile forms would probably result in death. Large motile forms such as fish, crabs or lobster would have a better chance of survival. Recolonization by smaller shortlived pioneering species would occur soon after disposal. Rhoads, et al (1978) and McCall (1977) have shown that successions of benthic communities would follow until a climax community of longer-lived larger species became established. This could occur provided that the site were not disposed on again within a few years. Once established, the tubes of many recolonized invertebrates would serve to stabilize the bottom surface. Complete recovery of benthic productivity, if it occurs at all, would be difficult to predict but could occur in from 1.5 years (U.S. Navy, 1979) to 11 years (as calculated by Saila, 1973) provided subsequent dumping did not occur. Complete recovery would probably not occur at the Foul Area, however, since it is a designated dump site and would be expected to remain in continuous use indefinitely.

ii Chemical Effects - The ocean dumping criteria described previously are intended to insure that no significant undesirable effects will occur beyond the disposal area limits. The granular, uncontaminated nature of the East Boat Basin material enables us to consider it to be environmentally acceptable for ocean disposal without further testing. This precludes the necessity for bioassay/bioaccumulation analyses. Since the material exhibits low concentrations of chemical contaminant constituents, its disposal at the Foul Area should not produce any measurable negative chemical effects on any marine biota.

d. Threatened and Endangered Species - The humpback and finback whales are present in the Stellwagen Basin area during the late spring, summer, and early fall months. Based on the maximum June and July densities of these species recorded for the outer Massachusetts Bay area (1979 data from URI, 1981 and 1981 data from Mason Weinrich), the expected density of individuals within a 2 nautical mile radius (12.5 nm^2 or 43 km^2) of the Foul Area discharge buoy would be 0.73-1.25 individuals for each species in June and July. This assumes an equal distribution of animals throughout the bay area which is not actually the case. No actual sightings were made within a 2 nm radius of the discharge buoy in the above data collection efforts (see Section VB4). Nevertheless, we can assume as the worst case that one or two individuals may be present within the 12.5 nm^2 dumpsite area during the summer.

Section IV of this report notes that the project work may take about two years to complete. It is estimated that there will be a maximum of two scow trips per day to the dumpsite during this period. However, it is expected that dredging and excavation will be limited during the summer months because of increased recreational boating in the canal area during that time. Consequently, there should be very limited disposal activity at the Foul Area during the greatest whale activity in the vicinity. At most, it is estimated that any disposal activity concurrent with the period of whale activity would be on the order of about 5-10 minutes/day. This would result in a low probability of encounter with minimal impact to feeding individuals in the area.

The increased boat traffic in the area would slightly increase the chance of collision with "logging" whales at the surface. However, several of the preferred areas - Jeffrey's Ledge, Stellwagen Bank, the Provincetown Slope, and Great South Channel in particular - lie directly in the main shipping lanes to Boston, Massachusetts and other Gulf of Maine seaports. The fact that the animals continue to concentrate on these feeding banks, and utilize these migration routes in spite of the present high level of vessel traffic, supports the theory that feeding and migrating whales do not exhibit significant avoidance behavior to general ship traffic. Therefore, any increase in such traffic due to disposal is unlikely to significantly affect the species using these areas, especially since the scows will not be transiting through the bank area but only to a point to the west and then turning and returning to port.

If by chance a whale is dumped on during disposal activities, the effects on that individual would be unknown. No studies have been concerned with the effects of dredged material disposal on whales. The University of Guelph, Ontario, is preparing to conduct experiments on the effects of petroleum and drill cuttings on the integument of dolphins for the Bureau of Land Management. The studies have not yet begun and would have little applicability to the effects of dredged material (David St. Aubin, personal communication).

There is some concern about the possibility of impacts on the food species of the endangered species. Humpbacks, and to a certain extent finback whales feed on the sand lance (Ammodytes americanus) which has markedly increased in numbers in the bank area since 1975 (Meyer, et al, 1979).

Impacts to the sand lance may be broken down to the three aspects of their life activities: (1) daily activities in terms of schooling and burrowing, (2) their food source, and (3) reproductive habitat.

Most of the daily activities of the sand lance involve either swimming in schools or burrowing in suitable substrate. Impacts to their natural schooling movements are likely to be short term and localized. As mentioned above, the short time that disposal would actually take place (5-10 minutes per day) and the small affected area involved (0.05 nm² or

approximately 0.0005% of Massachusetts Bay) would reduce the chances of encounter with a passing school. It is likely that the school would avoid the disposal induced disturbance and not be affected because of their high mobility.

The sand lance also spends a portion of its time burrowing in the sand. It has a marked preference for clean sand and fine gravel substrate (NMFS, personal communication). The entire Foul Area dump site is in a basin made up of primarily silty clay (anthropogenic and naturally occurring) with associated currents which average 4-5 cm/sec. This area of sediment accumulation is not considered to be potential habitat for burrowing sand lance. The best habitat for such activity is on the Stellwagen Bank, east of the disposal site. Because of the low magnitude of the currents at the disposal site, the high magnitude of the currents on the Stellwagen Bank, and the 200 foot ridge east of the dump site that isolates the site from the bank area, resuspension, movement, and deposition of dredged material on the preferred burrowing habitat on the bank would be unlikely.

It is not expected that the sand lance would significantly accumulate sediment contaminants. Approximately 99% of the sediment is expected to settle to the bottom almost immediately. Elutriate tests on the sediment to be dredged show very little release of constituents of concern to the water column. Also, studies have shown that release of any contaminants during disposal is a short-term phenomenon and that background levels would return soon after disposal (Wright, 1978 Burks & Engler, 1978). Due to the high mobility of schooling sand lance which might be in the vicinity of the area during or shortly after disposal and given the low level of release expected, it is doubtful that any individuals would be sufficiently exposed to the affected area long enough for any significant accumulation to occur. Since it is unlikely that the sand lance would burrow in the deposited sediment, accumulation from the sediments would not be of concern.

Few studies on the reproductive habitat of the sand lance have been done. However, NMFS (personal communication) has indicated that the usual spawning substrate is clean sand or fine gravel in about 20 feet of water or less. The Foul Area offers no potential for such habitat and therefore little or no short-term impacts and no long-term impacts are expected on the sand lance population due to the proposed disposal activities.

Based on the above discussion, it is expected that the proposed disposal operations would have minor or no impact on the humpback or finback whales which may use the area. The dredged material disposal would be closely controlled and monitored to insure accurate deposition. This historical disposal site is situated in a deep basin where relatively low bottom currents have made the area a long-term fine-sediment accretion zone. Once the material is deposited, the currents are not of sufficient magnitude to significantly disrupt the bottom. No impacts are expected on the preferred habitat of these species, located 3-4 nm to the east of the disposal site.

The size of the affected discharge area would be about a 250 meter radius around the discharge buoy (0.05 square nm area). This is approximately 0.0005% of the total area of Massachusetts Bay available to the whales for feeding habitat. The density of whales (worst case) in the 12.5 nm² area in which the discharge site is located is about one individual per species. This represents about 0.16% of the total population of humpback and finback whales which use Massachusetts Bay. Thus, given (1) that the preferred Stellwagen Bank habitat for the whales and sand lance would not be affected, (2) the small size of the affected area, and (3) the small number of potentially affected individuals, minor or no impact to the population of the whales or prey species is expected.

e. Historic and Archaeological Resources - As the material will be deposited in a previously used disposal site, no effect upon significant historic or archaeological resources is anticipated.

VII. Alternatives to the Proposed Action

A. Development Alternatives

The study considered a number of management measures to address the planning objectives, including a no-action alternative, nonstructural measures, and structural measures. The no-action alternative was eliminated since none of the existing problems would be alleviated, or future needs met. Also, it was determined that implementation of nonstructural measures would not satisfactorily address the planning objectives, particularly those of contributing to the growth of the commercial fishing and recreational boating fleets at the East Boat Basin.

The implementation of structural improvements would enable the East Boat Basin to accommodate a greater number of commercial fishing vessels and recreational boats. The opportunity would be provided to capitalize on future demands of these activities, including onland development. The incorporation of a more clearly defined navigation system would provide a better organization of basin activities than at present. The state of the regional fishing industry would be enhanced.

A range of preliminary structural plans was formulated to examine various degrees of improvement. They ranged from a primarily nonstructural plan that considered the possibility of maximizing use of the existing basin, to a number of plans examining various degrees of basin expansion. The primary criteria for screening the preliminary alternative structural plans was their contribution to National Economic Development (NED), and acceptability of plans to local interests. Based on the screening criteria, four structural alternatives, identified as Plans A, B, C, and D, were carried forward for further study. All of the detailed plans are similar in concept, since they all consider physical expansion of the existing basin. The major variations between plans are in the amount, and configuration of expansion. In all other aspects, such

as depth and width dimensions, they are similar. The descriptions of detailed plans, and the formulation process followed, are discussed in Appendix 2, Formulation, Assessment and Evaluation of Plans.

Plan C, shown on the previous Figure 13 of the main body, was recommended as the selected plan. Comparison and evaluation of detailed plans found that Plan C contributed the most toward the NED account.

B. Disposal Alternatives.

A number of potential upland and open-water disposal sites were identified in the early phases of the study. Further study of the identified sites, including extensive coordination with concerned interests, reduced the number of viable sites to one, the Foul Area open-water site. The rationale leading to the selection of the Foul Area as the recommended disposal alternative is provided in Appendix 1, Environmental.

VIII. Coordination

The Corps of Engineers has consulted with numerous organizations and agencies and the public to gather information and opinions for this study and to keep them informed on its progress. Table EA-7 summarizes the findings of this coordination in relation to specific environmental statutes. Official correspondence may be found in Appendix 3.

Table EA-7

Relationship of the Selected Plan to
Environmental Protection Statutes

Federal Statutes

Archaeological and Historic Preservation Act, as amended, 16, U.S.C. 469 <u>et seq.</u>	A
Clean Air Act, as amended, 42 U.S.C. 7401, <u>et seq.</u>	NA
Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251 <u>et seq.</u>	A
Coastal Zone Management Act, as amended, 16 U.S.C. 1451, <u>et seq.</u>	A
Endangered Species Act, as amended, 16 U.S.C. 1531 <u>et seq.</u>	A
Estuary Protection Act, 16 U.S.C. 1221, <u>et seq.</u>	A
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), <u>et seq.</u>	NA
Fish and Wildlife Coordination Act, as amended, U.S.C. 661, <u>et seq.</u>	A
Land and Water Conservation Fund Act, as amended, 16 U.S.C. 4601 - 4601-11, <u>et seq.</u>	NA
Marine Protection, Research and Sanctuaries Act, 22 U.S.C. 1401, <u>et seq.</u>	A
National Historic Preservation Act, as amended, 16 U.S.C. 470a, <u>et seq.</u>	A
National Environmental Policy Act, as amended, 42 U.S.C. 4321, <u>et seq.</u>	A
River and Harbor Act, 33 U.S.C. 401 <u>et seq.</u>	NA
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, <u>et seq.</u>	NA
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, <u>et seq.</u>	NA

Executive Orders, Memoranda, etc.

Flood Plain Management (E.O. 11988)	A
Protection of Wetlands (E.O. 11990)	A
Environmental Effects Abroad of Major Federal Actions (E.O. 12114)	NA
Analysis of Impacts on Prime and unique Farmlands (CEQ Memorandum 30 Aug. 76)	NA

NOTES: a. Applicable (A) - Statute, E.O., or other policy is applicable and has been complied with.
b. Not Applicable (NA) - Statute, E.O., or other policy not applicable.

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FINDING OF NO SIGNIFICANT IMPACT

The proposed East Boat Basin project comprises expansion of the existing East Boat Basin, located on the Cape Cod Canal in Sandwich, Massachusetts, to accommodate additional recreational and commercial boats, plus some additional dredging in the existing basin, including construction of an entrance channel. The total area to be taken up by the expansion of the basin would be about 12 acres. Total amount of material to be removed would be 534,470 cubic yards, including 29,550 cubic yards of dredged material. Material would be placed in scows for dumping at the Foul Area ocean disposal site about 50 miles to the northeast of the boat basin.

Various alternatives were considered both for development of the basin expansion and disposal of the dredged and excavated materials. Disposal alternatives included both upland and open-water sites. The selected development and disposal plans would create virtually no adverse environmental impacts.

After a complete, in-depth study and with coordination from other agencies, I have determined that the proposed project will not have any significant impacts which would necessitate the preparation of an Environmental Impact Statement.

Date

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

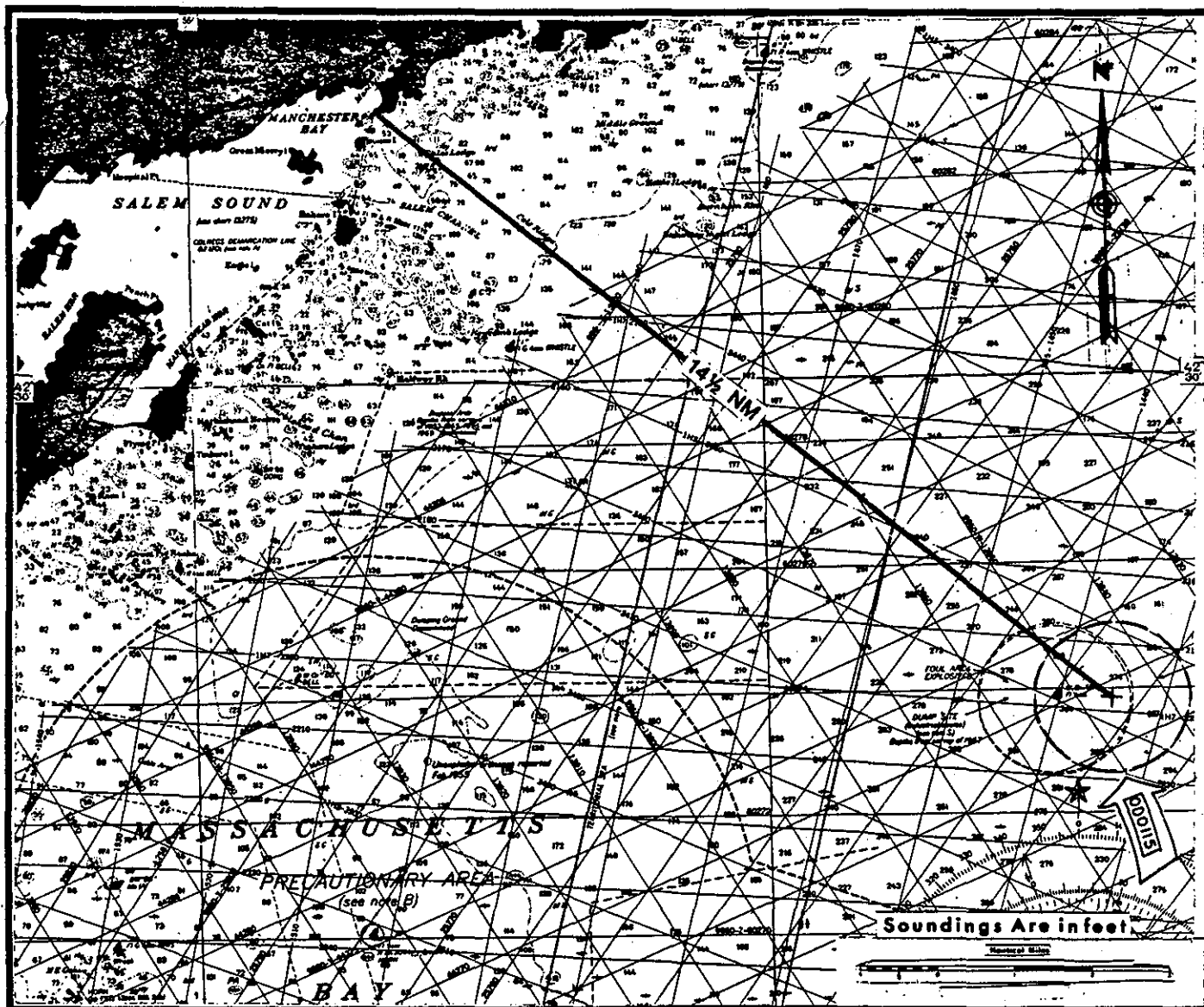


Figure EA-1 FOUL AREA, MASS. BAY

EPA 000115: FOUL AREA

DEPTH RANGE: 159 TO 304 FEET MLW

CENTER COORDINATES: 42°-25.7'N, 70°-34.0'W

DESCRIPTION: THIS EPA APPROVED INTERIM SITE IS A CIRCULAR AREA WITH A DIAMETER OF 2 NAUTICAL MILES AND CENTER AT 42°-25.7'N, 70°-34.0'W. FROM THE CENTER, THE MARBLEHEAD TOWER BEARS TRUE 282° AT 24,300 YARDS AND BAKERS ISLAND HORN BEARS TRUE 300° AT 24,300 YARDS.

N.O.S. CHART: 13267

DATE: 20 DECEMBER 1980

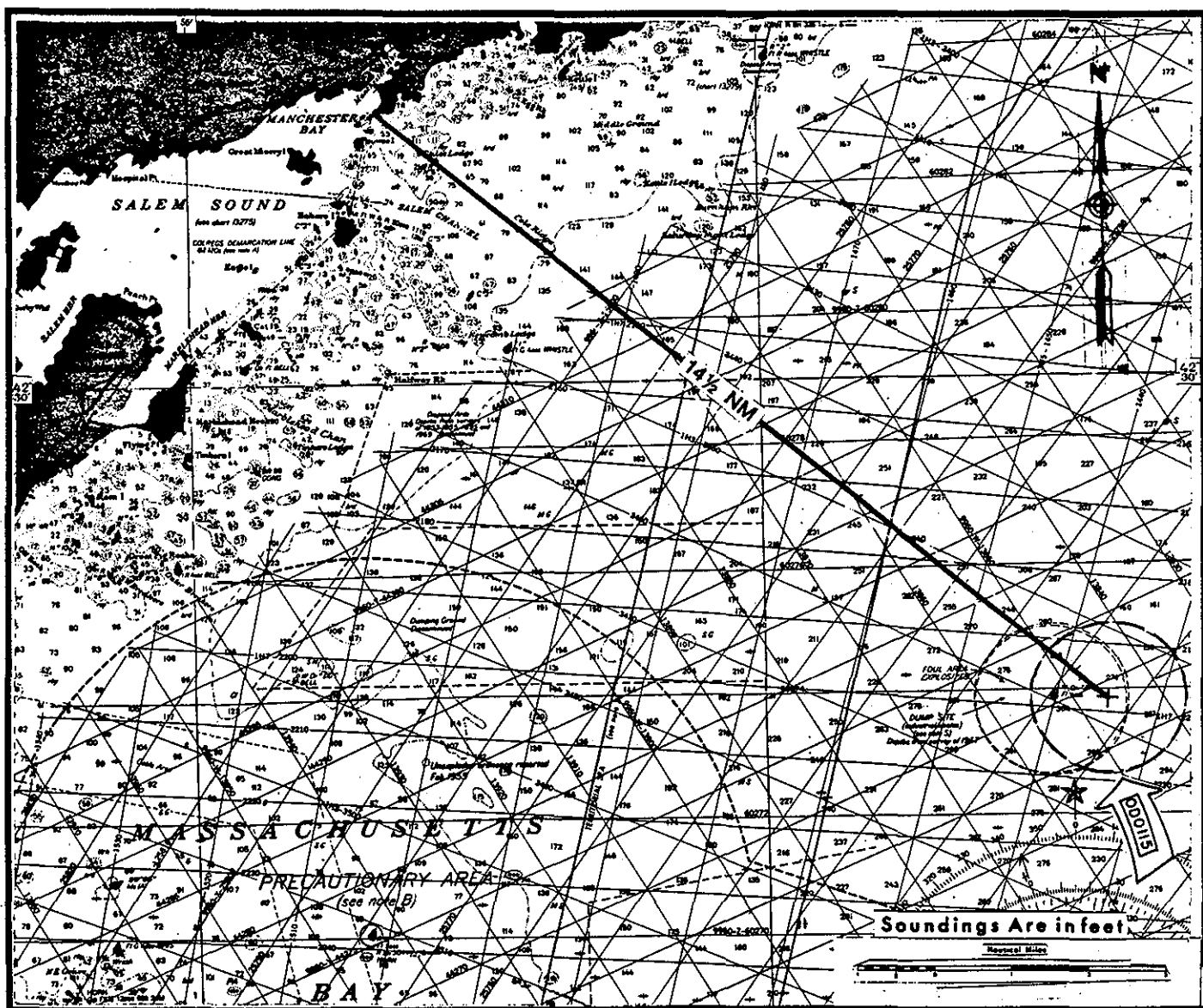


Figure EA-1 FOUL AREA, MASS. BAY

EPA 000115: FOUL AREA
 DEPTH RANGE: 159 TO 304 FEET MLW
 CENTER COORDINATES: $42^{\circ}-25.7'N$, $70^{\circ}-34.0'W$
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N.O.S. CHART: 13267
 DATE: 20 DECEMBER 1980

Table EA-3

Benthic Species Recovered at the Foul Area, (NEA, 1975)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Priapulida																								
<i>Priapula caudatus</i>																					2			
Sipunculoidea																								
<i>Golfingia</i> sp.	5	8							9	55	9		8	3			11		8		10	9	4	
<i>Phascolion strombi</i>															2								1	
Nemertea																								
<i>Micrura albida</i>																	1						1	
<i>Nemertine</i> sp.																					1			
Mollusca																								
Gastropoda																								
<i>Acmaea testudinalis</i> *					1																			
<i>Admete couthouyi</i> *			1																					
<i>Buccinum undatum</i> *			1		1	1	6						1	1		1						1		
<i>Colus pygmaeus</i> *																	1							
<i>Crepidula convexa</i> *			1		1		5																	
<i>Hydrobia minuta</i> *								5																
<i>Littorina obtusata</i> *								1																
<i>Mitrella lunata</i> *					5		9																	
<i>Nassarius trivittatus</i> *					1		5	1																
<i>Polinicies immaculata</i>							2				1													
<i>Retusa obtusa</i> *							3	1																
<i>Scaphander punctostriata</i> *																						2		
<i>Triphora perversa</i>																								
<i>nigrocincta</i> *			1		3		28	1																
<i>Turbonilla interrupta</i> *					1		6	6																
<i>Urosalpinx cinera</i> *								2																

*No living representatives of these species were recovered.

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mollusca																								
Pelecypoda																								
Anomia simplex*							2				1				1									
Astarte quadrans*			1																					
Astarte undata			3	1			1									25	1							
Cerastoderma pinnulatum				1						1		1				18		1	7	1				
Crassostrea virginica*								3																
Crenella faba*																1								
Crenella glandula*																3								
Gemma gemma*								8																
Hiatella arctica															1									
Hiatella striata																			2					
Kellia suborbicularis*								11																
Macoma balthica*			1								1											3	1	
Macoma calcarea		1	2	2			5	6			1			1	5		1		3					
Mulinia lateralis*								2																
Mya arenaria*					+	+	+	9		+											2	1	1	
Mytilus edulis*					+	+	+	4		+									+					
Nucula tenvis			9	3				2								2	9			1		2		1
Nuculana pernula			1							1						2						1		
Pitar morrhuana*							1															1		
Placopecten magellanicus*																1								
Thyasira sp.	4	2	2	18		2	6	5	2		38	19	1		23	7		4		15	4	7	9	
Venericardia borealis																5								
Yoldia inflata*											1	3					1			2				1
Yoldia iris				2			1					2	1		1			1				1		
Yoldia lucida*									1		1		1									2		
Yoldia subangulata*	1						1					1										2		1

+Denotes shell fragments.

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Annelida																								
<i>Ammotrypane aulogaster</i>	1								1				1					1						
<i>Ancystrocyllis groenlandicus</i>											2						1						1	
<i>Apisthobranchus tullbergi</i>											1	15		2					3		6	16	4	
<i>Aricidea quadrilobata</i>	1								2		3		1						2			2	3	
<i>Capitella</i> sp.		1		6					15	79	3		7	1			3		8		17	49	22	
<i>Chaetozone setosa</i>	9	5		4													1							
<i>Ephesiella minuta</i>											1								2			1		
<i>Eteone longa</i>	1	1		1													1		1					
<i>Eteone trilineata</i>											1					1								
<i>Euchone rubrocincta</i>																1								
<i>Eunice</i> sp.																1								
<i>Glycera</i> sp.											1	1	1				3	1			1			7
<i>Goniada maculata</i>		3														1						1		
<i>Harmathoe imbricata</i>	1																							
<i>Heteromastus filiformis</i>	11	22		19		4			6	8	32	12		17	4		6	7	12		7	4	63	8
<i>Lumbrineris fragilis</i>	2										1							6	2			1	2	
<i>Lumbrineris latreilli</i>																			1					
<i>Magelona</i> sp.											1					1								
<i>Maldane sarsi</i>				1					1			1										1		1
<i>Nephtys bucera</i>						1	1			1		1										1		2
<i>Nephtys incisa</i>	1	2									1	1							5			2	2	
<i>Nicomache lumbricalis</i>											1	1	2				1	1			1			2
<i>Ninoe nigripes</i>			1	1					1	2	1	2												
<i>Ninoe</i> sp.	1																							
<i>Pectinaria</i> sp.				3	1											4	1	9						
<i>Phloe minuta</i>				1						1						2		1			1			4
<i>Polydora concharum</i>																1								
<i>Praxillella praetermissa</i>			1																					
<i>Prionospio</i> sp.	6	7		3					10	2	18	7	1	5	4	2		3	13		1	17	11	21
<i>Scoloplos acutus</i>	1			1					1	2	2	8	1	1		1			14			1	5	
<i>Scoloplos armiger</i>																								
<i>Spio filicornis</i>		3		8		11				4	57	12		7	18	98		23	38	29		2	148	178

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Annelida, cont.																								
Stauronereis caeca													1								1	1		
Sternaspis scutata	3	3		1							2			3					1	1				
Terebellides stroemi																					1			
Tharyx sp. A									1										1					
Tharyx sp. B										1														
Arthropoda																								
Ampelisca macrocephala																	1					1		
Ampithoe rubricata															1									
Anonyx lilljeborgi													1											
Balanus balanoides*					2	+	+								1+	+		+						
Eudorella emarginata				1							3													
Eudorella truncatula															1									
Harpinia propinqua	1										2								1		6	2	2	
Echinodermata																								
Ctenodiscus crispatus									1		2												6	
Molpadia sp.									1			1	1											
Number of Individuals	48	59	21	81	16	3	97	68	51	25	321	94	9	52	66	181	13	57	77	131	13	75	338	284
Number of Species	15	13	9	23	11	5	21	17	13	14	27	22	9	12	13	24	5	13	14	24	6	15	30	25

Table EA-4

Foul Area - DAMOS Benthos (NUSC, 1979)

DATE: 18 DECEMBER 1977

PREDOMINANT SPECIES	DREDGE NUMBER				MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL. % OF TOTAL
	#1	#2	#3	TOTAL							
1. <i>Ninoe nigripes</i>	7	11	8	26	8.7	2.1	0.5	3.5-13.9	1	14.5	14.5
2. <i>Sternaspis scutata</i>	0	8	15	23	7.7	7.5	7.3	0-26.3	2	12.8	27.3
3. <i>Praxillella gracilis</i>	0	7	7	14	4.7	4.0	3.4	0-14.6	3	7.8	35.1
4. <i>Molpadia oolitica</i>	0	5	6	11	3.7	3.2	2.8	0-11.7	4	6.1	41.2
5. <i>Lumbrineris tenuis</i>	1	7	2	10	3.3	3.2	3.2	0-11.3	5	5.6	46.8
6. <i>Myriodula heeri</i>	0	5	4	9	3.0	2.6	2.3	0- 9.5	6	5.0	51.8
7. <i>Yoldia lucida</i>	0	7	2	9	3.0	3.6	4.3	0-11.9	6	5.0	56.8
8. <i>Scoloplos acutus</i>	0	6	2	8	2.7	3.1	3.6	0-10.4	7	4.5	61.3
9. <i>Micrura</i> sp.	0	5	2	7	2.3	2.5	2.7	0- 8.5	8	3.9	65.2
10. <i>Ctenodiscus crispatus</i>	1	5	0	6	2.0	2.6	3.4	0- 8.5	9	3.4	68.6
11. <i>Goniada maculata</i>	2	3	0	5	1.7	1.5	1.3	0- 5.4	10	2.8	71.4
12. <i>Nucula tenuis</i>	0	2	2	4	1.3	1.2	1.1	0- 4.3	11	2.2	73.6
13. <i>Spio Filicornis</i>	1	2	1	4	1.3	0.6	0.3	0- 2.8	11	2.2	75.8
14. <i>Yoldia thraciaeformis</i>	0	2	2	4	1.3	1.2	1.1	0- 4.3	11	2.2	78.0
15. <i>Nephtys incisa</i>	1	2	0	3	1.0	1.0	1.0	0- 3.5	12	1.7	79.7
16. <i>Ophiura sarsi</i>	0	0	3	3	1.0	1.7	2.9	0- 5.2	12	1.7	81.4
TOTAL	13	77	56	146	48.7	32.6	21.9	0-129.7			
TOTAL NO. OF SPP PER DREDGE	9	31	20	39	20.0	11.0		0- 47.3			
SPECIES DIVERSITY (H')	1.87	3.12	2.59	7.58	2.53	0.63					
EQUITABILITY (J')	0.85	0.91	0.87	2.63	0.88	0.03					

TOTAL NO. OF INDIVIDUALS THIS STATION = 179

Table EA-5

Foul Area - DAMOS Benthos (SAI, 1980)

Date: 6 December 1978

Predominant Species	Sample No.					Number of Individuals				95% Conf. Limits of Mean	Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	1	2	3	4	5	Total	Mean	Std. Dev.	Coeff. of Dispersion				
1. <i>Ninoe nigripes</i>	12	11	9	-	-	42	10.7	1.5	0.2	6.9 - 14.5	1	20.0	20.0
2. <i>Ampharete arctica</i>	12	5	8	-	-	25	8.3	3.5	1.5	0 - 17.1	2	11.9	31.9
3. <i>Lumbrineris fragilis</i>	4	9	12	-	-	25	8.3	4.0	1.9	0 - 18.4	2	11.9	43.8
4. <i>Cirratulid sp.</i>	17	0	0	-	-	17	5.7	9.8	16.8	0 - 30.1	3	8.1	51.9
5. <i>Thyasira insignis</i>	4	10	0	-	-	14	4.7	5.0	5.3	0 - 17.2	4	6.7	58.6
6. <i>Yoldia sapotilla</i>	8	4	1	-	-	13	4.3	3.5	2.8	0 - 13.1	5	6.2	64.8
7. <i>Micrura sp.</i>	7	3	2	-	-	12	4.0	2.6	1.7	0 - 10.6	6	5.7	70.5
8. <i>Scoloplos acutus</i>	8	1	1	-	-	10	3.3	4.0	4.8	0 - 13.4	7	4.8	75.3
9. <i>Goniada maculata</i>	0	2	6	-	-	8	2.7	3.1	3.6	0 - 10.3	8	3.8	79.1
10. <i>Tharyx acutus</i>	0	3	5	-	-	8	2.7	2.5	2.3	0 - 8.9	8	3.8	82.9
11. <i>Spio filicornis</i>	3	1	2	-	-	6	2.0	1.0	0.5	0 - 4.5	9	2.9	85.8
12. <i>Melinna cristata</i>	1	0	4	-	-	5	1.7	2.1	2.6	0 - 6.8	10	2.4	88.2
13. <i>Laonice cirrata</i>	0	3	1	-	-	4	1.3	1.5	1.7	0 - 5.1	11	1.9	90.1

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H')	2.54	2.44	2.58	-	-	2.52	0.07
Equitability (J')	0.82	0.86	0.86	-	-	0.85	0.02

Table EA-6

Foul Area - DAMOS Benthos (SAI, 1980)

Date: 6 June 1979

Predominant Species	Number of Individuals										Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	Sample No.					Total	Mean	Std. Dev.	Coeff. of Dispersion	95% Conf. Limits of Mean			
	1	2	3	4	5								
1. Spio filicornis	31	57	55	58	147	348	69.6	44.7	28.7	14.1 - 125.1	1	54.8	54.8
2. Heteromastus filiformis	9	8	10	18	2	47	9.4	5.7	3.5	2.3 - 16.5	2	7.4	62.2
3. Chaetozone setosa	1	2	5	5	7	20	4.0	2.4	1.4	1.0 - 7.0	3	3.1	65.3
4. Trochochaeta multisetosa	0	3	1	2	11	17	3.4	4.4	5.7	0 - 8.9	4	2.7	68.0
5. Ninoe nigripes	7	1	3	1	4	16	3.2	2.5	2.0	0.1 - 6.3	5	2.5	70.5
6. Micrura sp.	6	3	3	2	1	15	3.0	1.9	1.2	0.7 - 5.3	6	2.4	72.9
9. Prionospio malmgreni	2	3	2	3	3	13	2.6	0.5	0.1	1.9 - 3.3	7	2.0	74.9
8. Scoloplos acutus	1	0	6	2	3	12	2.4	2.3	2.2	0 - 5.3	8	1.9	76.8

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H'):	2.32	1.96	2.18	2.36	1.37	2.04	0.41
Equitability (J'):	0.75	0.63	0.65	0.70	0.42	0.63	0.13

Table EA-3

Benthic Species Recovered at the Foul Area, (NEA, 1975)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Priapulida																								
Priapula caudatus																					2			
Sipunculoidea																								
Golfingia sp.	5	8							9	55	9		8	3			11	8			10	9	4	
Phascolion strombi															2								1	
Nemertea																								
Micrura albida																	1						1	
Nemertine sp.																						1		
Mollusca																								
Gastropoda																								
Acmaea testudinalis*					1																			
Admete couthouyi*				1																				
Buccinum undatum*				1	1	1	6						1	1		1						1		
Colus pygmaeus*																	1							
Crepidula convexa*				1	1		5																	
Hydrobia minuta*																								5
Littorina obtusata*																								1
Mitrella lunata*					5		9																	
Nassarius trivittatus*					1		5	1																
Polinicies immaculata							2					1												
Retusa obtusa*							3	1																
Scaphander punctostriata*																							2	
Triphora perversa																								
nigrocincta*				1	3		28	1																
Turbonilla interrupta*					1		6	6																
Urosalpinx cinera*								2																

*No living representatives of these species were recovered.

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mollusca																								
Pelecypoda																								
Anomia simplex*							2				1				1									
Astarte quadrans*			1																					
Astarte undata			3	1			1									25	1							
Cerastoderma pinnulatum				1						1		1				18		1	7	1				
Crassostrea virginica*								3																
Crenella faba*																1								
Crenella glandula*																3								
Gemma gemma*								8																
Hiatella arctica															1									
Hiatella striata																			2					
Kellia suborbicularis*								11																
Macoma balthica*			1								1													
Macoma calcarea		1	2	2			5	6			1			1	5		1		3			3	1	
Mulinia lateralis*								2																
Mya arenaria*					+	+	+	9		+											2	1	1	
Mytilus edulis*					+	+	+	4		+								+						
Nucula tenuis			9	3				2			3	2	1			2	9		1		2		1	
Nuculana pernula			1							1						2						1		
Pitar morrhuana*							1															1		
Placopecten magellanicus*																1								
Thyasira sp.	4	2	2	18		2	6	5	2		38	19	1		23	7		4		15		4	7	9
Venericardia borealis																5								
Yoldia inflata*											1	3					1		2				1	
Yoldia iris				2			1					2	1		1			1				1		
Yoldia lucida*									1		1		1									2		
Yoldia subangulata*	1						1					1										2	1	

+Denotes shell fragments.

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Annelida																								
<i>Ammotrypane aulogaster</i>	1								1				1						1					
<i>Ancystrocyllis groenlandicus</i>											2							1						1
<i>Apisthobranchus tullbergi</i>									1															
<i>Aricidea quadrilobata</i>	1								1	15			2						3		6	16	4	
<i>Capitella</i> sp.		1		6					2		3		1						2			2	3	
<i>Chaetozone setosa</i>	9	5		4					15	79	3		7	1				3		8	17	49	22	
<i>Ephesiella minuta</i>																		1						
<i>Eteone longa</i>	1	1		1							1									2			1	
<i>Eteone trilineata</i>																		1		1				
<i>Euchone rubrocincta</i>											1					1								
<i>Eunice</i> sp.																1								
<i>Glycera</i> sp.																1								
<i>Goniada maculata</i>		3								1	1	1						3	1		1			7
<i>Harmathoe imbricata</i>	1															1						1		
<i>Heteromastus filiformis</i>	11	22	19			4			6	8	32	12		17	4			6	7	12	7	4	63	8
<i>Lumbrineris fragilis</i>	2										1								6	2		1	2	
<i>Lumbrineris latreilli</i>																				1				
<i>Magelona</i> sp.												1												
<i>Maldane sarsi</i>				1					1			1				1								
<i>Nephtys bucera</i>						1	1			1		1												
<i>Nephtys incisa</i>	1	2									1										1		2	
<i>Nicomache lumbricalis</i>											1	1								5		2	2	
<i>Ninoe nigripes</i>			1	1					1	2	1	2						1	1		1			2
<i>Ninoe</i> sp.	1																							
<i>Pectinaria</i> sp.				3		1										4		1	9					
<i>Phloe minuta</i>				1						1						2			1		1			4
<i>Polydora concharum</i>																1								
<i>Praxillella praetermissa</i>			1																	1			1	
<i>Prionospio</i> sp.	6	7		3					10	2	18	7	1	5	4	2			3	13	1	17	11	21
<i>Scoloplos acutus</i>	1			1					1	2	2	8	1	1		1				14			1	5
<i>Scoloplos armiger</i>																							1	
<i>Spio filicornis</i>		3		8			11			4	57	12		7	18	98		23	38	29		2	148	178

Table EA-3 (Continued)

	North				Center				South				East				West				Control			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Annelida, cont.																								
Stauronereis caeca													1								1		1	
Sternaspis scutata	3	3		1							2			3				1		1				
Terebellides stroemi																					1			
Tharyx sp. A									1									1						
Tharyx sp. B										1														
Arthropoda																								
Ampelisca macrocephala																	1						1	
Ampithoe rubricata																1								
Anonyx lilljeborgi													1											
Balanus balanoides*					2	+	+								1+	+		+						
Eudorella emarginata				1							3													
Eudorella truncatula															1									
Harpinia propinqua	1										2								1		6	2	2	
Echinodermata																								
Ctenodiscus crispatus									1		2												6	
Molpadia sp.									1			1	1											
Number of Individuals	48	59	21	81	16	3	97	68	51	25	321	94	9	52	66	181	13	57	77	131	13	75	338	284
Number of Species	15	13	9	23	11	5	21	17	13	14	27	22	9	12	13	24	5	13	14	24	6	15	30	25

Table EA-4

Foul Area - DAMOS Benthos (NUSC, 1979)

DATE: 18 DECEMBER 1977

PREDOMINANT SPECIES	DREDGE NUMBER			TOTAL	MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL. % OF TOTAL
	#1	#2	#3								
1. <i>Ninoe nigripes</i>	7	11	8	26	8.7	2.1	0.5	3.5-13.9	1	14.5	14.5
2. <i>Sternaspis scutata</i>	0	8	15	23	7.7	7.5	7.3	0-26.3	2	12.8	27.3
3. <i>Praxillella gracilis</i>	0	7	7	14	4.7	4.0	3.4	0-14.6	3	7.8	35.1
4. <i>Molpadia oolitica</i>	0	5	6	11	3.7	3.2	2.8	0-11.7	4	6.1	41.2
5. <i>Lumbrineris tenuis</i>	1	7	2	10	3.3	3.2	3.2	0-11.3	5	5.6	46.8
6. <i>Myriodule heeri</i>	0	5	4	9	3.0	2.6	2.3	0-9.5	6	5.0	51.8
7. <i>Yoldia lucida</i>	0	7	2	9	3.0	3.6	4.3	0-11.9	6	5.0	56.8
8. <i>Scoloplos acutus</i>	0	6	2	8	2.7	3.1	3.6	0-10.4	7	4.5	61.3
9. <i>Micrura</i> sp.	0	5	2	7	2.3	2.5	2.7	0-8.5	8	3.9	65.2
10. <i>Ctenodiscus crispatus</i>	1	5	0	6	2.0	2.6	3.4	0-8.5	9	3.4	68.6
11. <i>Goniada maculata</i>	2	3	0	5	1.7	1.5	1.3	0-5.4	10	2.8	71.4
12. <i>Nucula tenuis</i>	0	2	2	4	1.3	1.2	1.1	0-4.3	11	2.2	73.6
13. <i>Spio Filicornis</i>	1	2	1	4	1.3	0.6	0.3	0-2.8	11	2.2	75.8
14. <i>Yoldia thraciaeformis</i>	0	2	2	4	1.3	1.2	1.1	0-4.3	11	2.2	78.0
15. <i>Nephthys incisa</i>	1	2	0	3	1.0	1.0	1.0	0-3.5	12	1.7	79.7
16. <i>Ophiura sarsi</i>	0	0	3	3	1.0	1.7	2.9	0-5.2	12	1.7	81.4
TOTAL	13	77	56	146	48.7	32.6	21.9	0-129.7			
TOTAL NO. OF SPP PER DREDGE	9	31	20	39	20.0	11.0		0-47.3			
SPECIES DIVERSITY (H')	1.87	3.12	2.59	7.58	2.53	0.63					
EQUITABILITY (J')	0.85	0.91	0.87	2.63	0.88	0.03					

TOTAL NO. OF INDIVIDUALS THIS STATION = 179

Table EA-5

Foul Area - DAMOS Benthos (SAI, 1980)

Date: 6 December 1978

Predominant Species	Sample No.					Number of Individuals				95% Conf. Limits of Mean	Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	1	2	3	4	5	Total	Mean	Std. Dev.	Coeff. of Dispersion				
1. <i>Ninoe nigripes</i>	12	11	9	-	-	42	10.7	1.5	0.2	6.9 - 14.5	1	20.0	20.0
2. <i>Ampharete arctica</i>	12	5	8	-	-	25	8.3	3.5	1.5	0 - 17.1	2	11.9	31.9
3. <i>Lumbrineris fragilis</i>	4	9	12	-	-	25	8.3	4.0	1.9	0 - 18.4	2	11.9	43.8
4. <i>Cirratulid sp.</i>	17	0	0	-	-	17	5.7	9.8	16.8	0 - 30.1	3	8.1	51.9
5. <i>Thyasira insignis</i>	4	10	0	-	-	14	4.7	5.0	5.3	0 - 17.2	4	6.7	58.6
6. <i>Yoldia sapotilla</i>	8	4	1	-	-	13	4.3	3.5	2.8	0 - 13.1	5	6.2	64.8
7. <i>Micrura sp.</i>	7	3	2	-	-	12	4.0	2.6	1.7	0 - 10.6	6	5.7	70.5
8. <i>Scoloplos acutus</i>	8	1	1	-	-	10	3.3	4.0	4.8	0 - 13.4	7	4.8	75.3
9. <i>Goniada maculata</i>	0	2	6	-	-	8	2.7	3.1	3.6	0 - 10.3	8	3.8	79.1
10. <i>Tharyx acutus</i>	0	3	5	-	-	8	2.7	2.5	2.3	0 - 8.9	8	3.8	82.9
11. <i>Spio filicornis</i>	3	1	2	-	-	6	2.0	1.0	0.5	0 - 4.5	9	2.9	85.8
12. <i>Melinna cristata</i>	1	0	4	-	-	5	1.7	2.1	2.6	0 - 6.8	10	2.4	88.2
13. <i>Laonice cirrata</i>	0	3	1	-	-	4	1.3	1.5	1.7	0 - 5.1	11	1.9	90.1

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H'):	2.54	2.44	2.58	-	-	2.52	0.07
Equitability (J'):	0.82	0.86	0.86	-	-	0.85	0.02

Table EA-6

Foul Area - DAMOS Benthos (SAI,1980)

Date: 6 June 1979

Predominant Species	Sample No.					Number of Individuals				95% Conf. Limits of Mean	Species Abundance Rank	Percent of Total Individuals	Cumulative Percent of Individuals
	1	2	3	4	5	Total	Mean	Std. Dev.	Coeff. of Dispersion				
1. <i>Spio filicornis</i>	31	57	55	58	147	348	69.6	44.7	28.7	14.1 - 125.1	1	54.8	54.8
2. <i>Heteromastus filiformis</i>	9	8	10	18	2	47	9.4	5.7	3.5	2.3 - 16.5	2	7.4	62.2
3. <i>Chaetozone setosa</i>	1	2	5	5	7	20	4.0	2.4	1.4	1.0 - 7.0	3	3.1	65.3
4. <i>Trochochaeta multisetosa</i>	0	3	1	2	11	17	3.4	4.4	5.7	0 - 8.9	4	2.7	68.0
5. <i>Ninoe nigripes</i>	7	1	3	1	4	16	3.2	2.5	2.0	0.1 - 6.3	5	2.5	70.5
6. <i>Micrura</i> sp.	6	3	3	2	1	15	3.0	1.9	1.2	0.7 - 5.3	6	2.4	72.9
9. <i>Prionospio malmgreni</i>	2	3	2	3	3	13	2.6	0.5	0.1	1.9 - 3.3	7	2.0	74.9
8. <i>Scoloplos acutus</i>	1	0	6	2	3	12	2.4	2.3	2.2	0 - 5.3	8	1.9	76.8

	Sample					Mean	Std. Dev.
	1	2	3	4	5		
Species Diversity (H')	2.32	1.96	2.18	2.36	1.37	2.04	0.41
Equitability (J')	0.75	0.63	0.65	0.70	0.42	0.63	0.13

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

APPENDIX 1
ENVIRONMENTAL

Prepared by the
New England Division, Corps of Engineers
Department of the Army

ENVIRONMENTAL

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ENVIRONMENTAL

This appendix discusses the environmental testing procedure performed on samples taken from the project area, and presents results of the tests. The disposal coordination process used in determining feasible disposal locations is also summarized.

ENVIRONMENTAL TEST RESULTS

Environmental testing was performed on material from both the proposed landcut (excavation) and the existing basin (dredging) areas. Figure 1-1 shows the sampling locations.

The test results on the material to be excavated represent borings at locations A, B, and C. The test results on the material to be dredged are from locations D (surface grab sample), E (surface grab sample), and F (sediment core).

Bulk chemical and physical analyses of samples A, B, and C were performed on composites of the material from the entire depth of each boring. Surface grab samples at D and E, and the sediment core at F were also analyzed for chemical and physical characteristics. The physical test results are presented in Tables 1-1 and 1-2. Bulk sediment chemistry results are presented in Table 1-3. Elutriate tests were performed only

Table 1-1

Physical Test Results - Landcut Sediment Samples

<u>Parameter</u>	<u>Sampling Location</u>		
	<u>A</u>	<u>B</u>	<u>C</u>
Visual Classification	Light Brown Silty Gravel, Medium Fine Sand (SM)	Light Brown Gravel, Silty Medium to Fine Sand (SM)	Brown to Gray Silty, Medium to Fine Sand (SM)
Grain Size			
D ₅₀	0.400	0.200	0.400
D ₇₅	1.300	2.000	3.200
D ₂₅	0.160	0.020	0.620
Sorting Coefficient	8.125	70.71	26.64
Curve Type	Bimodal	Bimodal	Bimodal
Specific Gravity	2.64	2.62	2.65
Percent Fines	17	35	26
Percent Solids	89.80	83.15	89.72
Liquid Limit	28-36	These value ranges were obtained from the foundation investigation performed for the study, and are representative of these parameters for the landcut material.	
Plastic Limit	16-27		
Plastic Index	2-17		
Percent Volatile Solids - EPA	0.9	2.5	1.2
Percent Volatile Solids - NED	0.6	1.6	0.6
Percent Natural Moisture Content	11.94	22.51	9.09

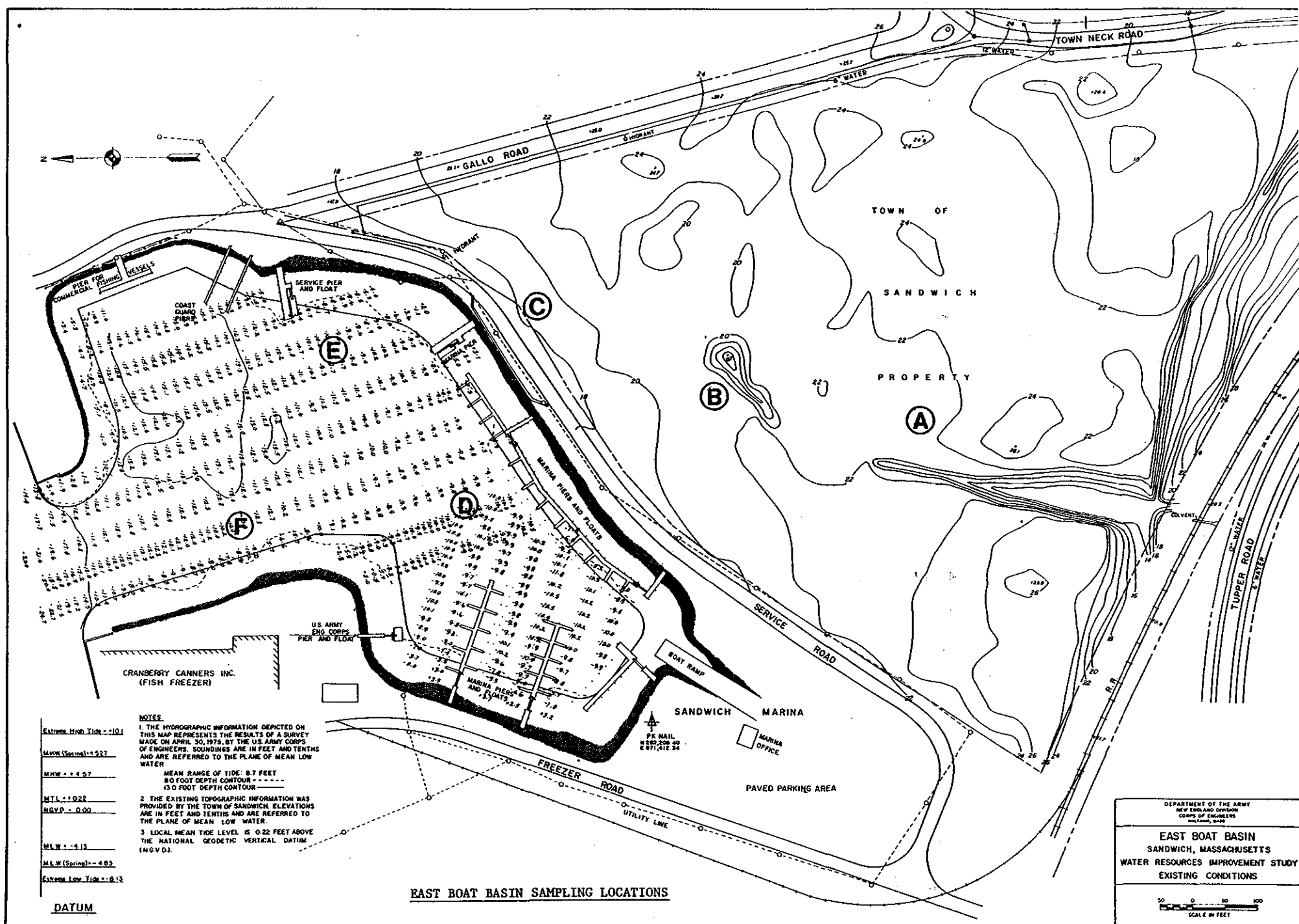


Table 1-2

Physical Test Results - Marine Sediment Samples

<u>Parameter</u>	<u>Sampling Location</u>		
	<u>D</u>	<u>E</u>	<u>F*</u>
Visual Classification	Dark Grey, Organic, Fine Sandy Silty Clay (OH)	Dark Grey, Organic Sandy Silty Clay (OH)	Dark Grey, Organic Silty Fine Sand (SM)
Grain Size			
D ₅₀	0.0170	0.0470	0.0670
D ₇₅	0.0380	0.0110	0.0860
D ₂₅	0.0045	0.0130	0.0230
Sorting Coefficient	8.4444	0.8462	3.7391
Curve Type	Normal	Normal	Normal
Specific Gravity	2.58	2.6	2.63
Percent Fines	85	60	48
Percent Solids	50.5	51.6	35.8 (74.41)
Liquid Limit	77	60	37
Plastic Limit	32	30	28
Plastic Index	45	30	9
Wet Unit Weight (PCF)	-	-	102.63
Dry Unit Weight (PCF)	-	-	63.30
Percent Volatile			
Solids - EPA	4.8	3.6	7.2 (2.7)
Percent Volatile			
Solids - NED	3.2	2.6	5.4 (1.6)

*Two depths were tested. Figures not in parenthesis represent results from a bottom surface sample. Figures in parenthesis represent results from a sample taken from a depth of 3.0' - 3.3' below the harbor bottom.

Table 1-3

Bulk Sediment Chemistry Test Results

<u>Parameter</u>	<u>Sampling Location</u>						
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F*</u>	
Percent Solids	89.8	83.15	89.72	50.5	51.6	35.8	(74.41)
Percent Volatile Solids - EPA	0.9	2.5	1.2	4.8	3.6	7.2	(2.7)
Percent Volatile Solids - NED	0.6	1.6	0.6	3.2	2.6	5.4	(1.6)
Chemical Oxygen Demand - ppm	3,140	36,370	63,460	48,000	33,000	70,800	(8070)
Total Kjeldahl Nitrogen - ppm	390	920	530	1,640	1,560	4,050	(440)
Oil & Grease	<30	32	61	773	448	2290	(96)
Mercury (Hg) - ppm	<0.05	0.13	<0.05	0.10	0.07	<0.05	(<0.05)
Lead (Pb) - ppm	<30	30	<30	80	87	63	(<30)
Zinc (Zn) ppm	82	196	59	121	133	196	(69)
Arsenic (As) - ppm	<0.05	2.7	3.4	9.5	9.5	6.4	(3.5)
Cadmium (Cd) - ppm	<3	<3	<3	3	3	<3	(<3)
Chromium (Cr) - ppm	<30	<30	<30	78	79	48	(<30)
Copper (Cu) - ppm	<10	<10	11	39	55	30	(12)
Manganese (Mn) - ppm	76	153	421	170	123	134	(78)
Nickle (Ni) - ppm	<40	<40	<40	<40	<40	<40	(<40)
Silver (Ag) - ppm	<15	<15	<15	<15	<15	<15	(<15)
Vanadium (V) - ppm	<200	<200	<200	<200	<200	<200	(<200)
DDT - ppb	<5	<5	<5	-	<5	-	(-)
PCB - ppb	<5	<5	<5	-	<5	-	(-)

*Two depths were tested. Figures not in parenthesis represent results from a bottom surface sample. Figures in parenthesis represent results from a sample taken from a depth of 3.0' - 3.3' below the harbor bottom.

on sample E, comprising three separate analyses (Table 1-4). The Extraction Procedure (EP) Toxicity Test was performed on material from all six sample locations (Table 1-5). Gradation curves have also been prepared for samples representing all six locations (Figures 1-2 through 1-7).

Physical results show that composite samples from borings made at locations A, B, and C have a wide range in grain size and average 75 percent sand and gravel. The spread in grain size reveals that the borings transected fill material and glacial till. Sediment from the basin (samples D, E, and F) becomes steadily coarser towards the basin entrance. The sand/gravel fraction is only 14 percent of the sediment at location D, but increases to 52 percent at location F.

The bulk chemical data for the basin sediments show the material to be uncontaminated. A majority of the values are below available averages for harbor sediments within the Gulf of Maine tidal system, of which the East Boat Basin is a part. There are no values substantially (over one standard deviation) greater than the harbor averages. Average concentration values in the land samples were lower than those of the basin samples. PCB and DDT values were below the instrument detection limits for the elutriate and bulk samples. The only substance in significant quantity in the EP Toxicity Test was barium. It should pose no problems, inasmuch as the concentration is well below the EPA limit for hazardous waste. Based on these test results no significant environmental problems would be expected to occur with upland or open-water disposal of the material.

Table 1-4

Elutriate Test Results

Results of tests performed on: (1) the standard elutriate prepared from one part sediment taken at various sampling locations with four parts water from each sampling location and (2) the virgin water from each sampling location are as follows:

Test Property	Dredge Site Water	Standard Elutriate Designation and Sediment Depth Used in Preparation		
	<u>E-EW</u>	<u>E-GP-81, G3; Surface</u>	R2	R3
		R1		
Nitrate-Nitrate Nitrogen (N), ppm		0.04	<0.03	<0.03
Ammonia Nitrogen (N), ppm		0.19	0.65	1.1
Sulfate (SO ₄), ppm	2,090	2,180	1,840	1,870
Oil & Grease, ppm	0.64	0.25	2.1	2.1
Phosphorus				
Ortho, ppm	0.03	<0.01	<0.01	<0.01
Total, ppm	0.03	<0.02	<0.02	<0.02
Mercury (Hg), ppb	<0.5	<0.5	<0.5	<0.5
Lead (Pb), ppb	<5	<5	<5	<5
Zinc (Zn), ppb	65	70	10	<5
Arsenic (As), ppb	<2	<2	<2	<2
Cadmium (Cd), ppb	<1	<1	<1	<1
Chromium (Cr), ppb	4	2	<2	5
Copper (Cu), ppb	5	1	<1	<1
Nickel (Ni), ppb	15	12	13	14
Silver (Ag), ppb	<2	<2	<2	<2
Vanadium (V), ppb	<20	<20	<20	<20
Total PCB, ppb	<0.1	<0.1	<0.1	<0.1
Total DDT, ppb	<0.1	<0.1	<0.1	<0.1
Manganese, ppb	17	66	125	88

Table 1-5

Extraction Procedure Toxicity Test Results*

<u>Substance</u>	<u>Maximum Concentrations</u>		<u>Sample Locations</u>					<u>F</u>
	<u>EP</u>	<u>Toxicity Regulations*</u>	<u>FD-2(A)</u>	<u>FD-4(B)</u>	<u>FD-5(C)</u>	<u>D</u>	<u>E</u>	
Endrin, ppb	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Lindane, ppb	400	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Methoxychlor, ppb	10,000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Toxaphene, ppb	500	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
2,4-D, ppm	10	0.02	0.02	0.02	0.02	0.02	0.02	
Silvex, ppm	1	0.02	0.02	0.02	0.02	0.02	0.02	
Mercury, ppm	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Silver, ppm	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Arsenic, ppm	5	0.01	0.002	<0.002	0.007	0.02	0.002	
Barium, ppm	100	3.10	2.10	2.10	1.75	4.75	15.00	
Cadmium, ppm	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chromium, ppm	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Lead, ppm	5	<0.1	0.04	0.01	0.01	<0.1	<0.1	
Selenium, ppm	1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	

*Federal Register, Monday 19 May 1980, 40 CFR 261.24

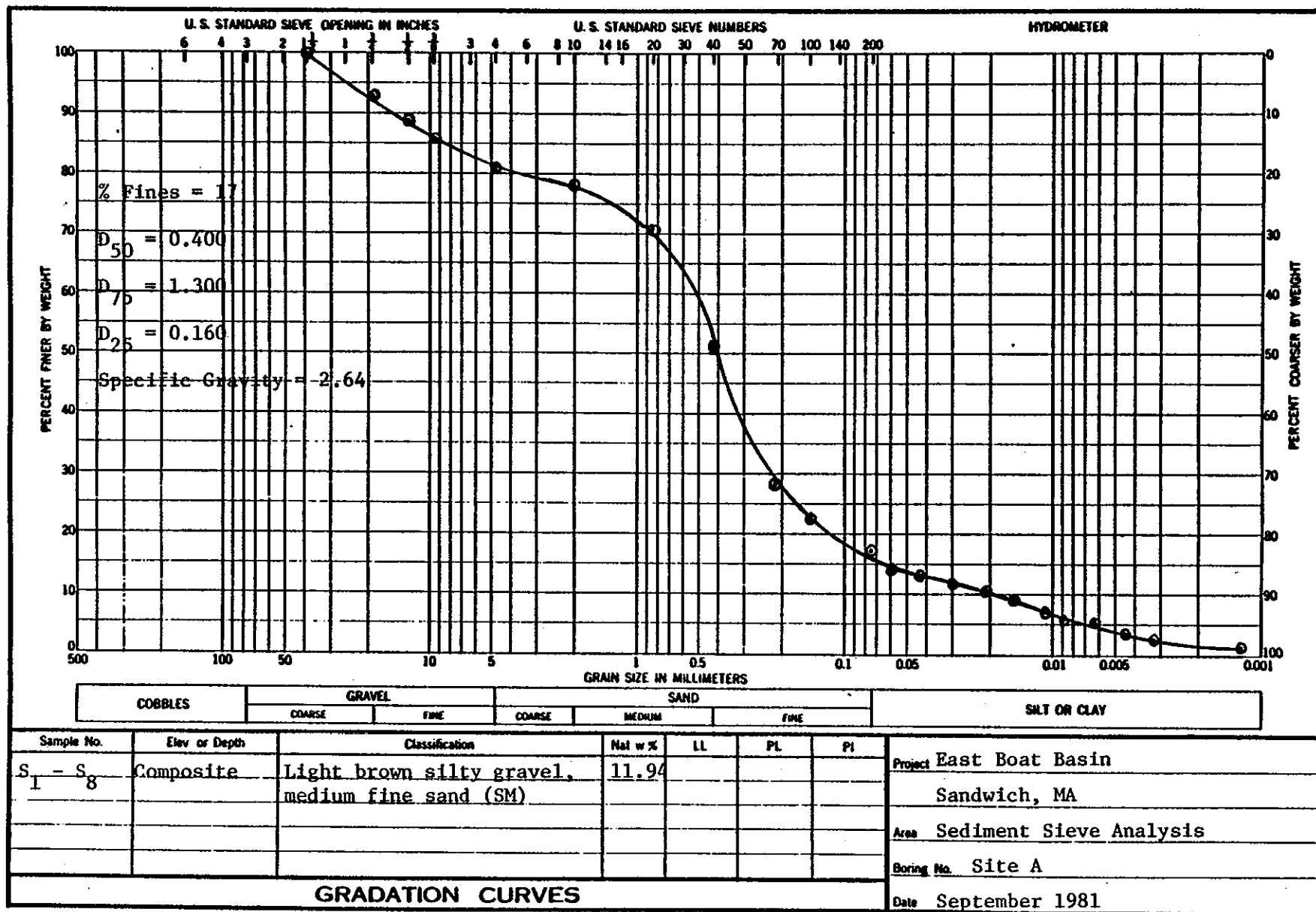
DISPOSAL OF PROJECT MATERIAL

Two modes of disposal were considered, open-water disposal and upland disposal. Whereas the traditional method for disposal of navigation project material has been in open-waters, it was recognized that the quantity and quality of material provided an opportunity for beneficial upland use. However, final selection of a disposal strategy will depend upon the economic and institutional constraints that are imposed on the project implementation process.

IDENTIFICATION OF DISPOSAL SITES

Coordination during the early phases of the study with local interests and the U.S. Fish and Wildlife Service identified a number of potential upland sites within the region. Also, two open-water disposal options were retained for investigation. The upland disposal site locations are indicated on Figure 1-8, and all identified options are discussed below.

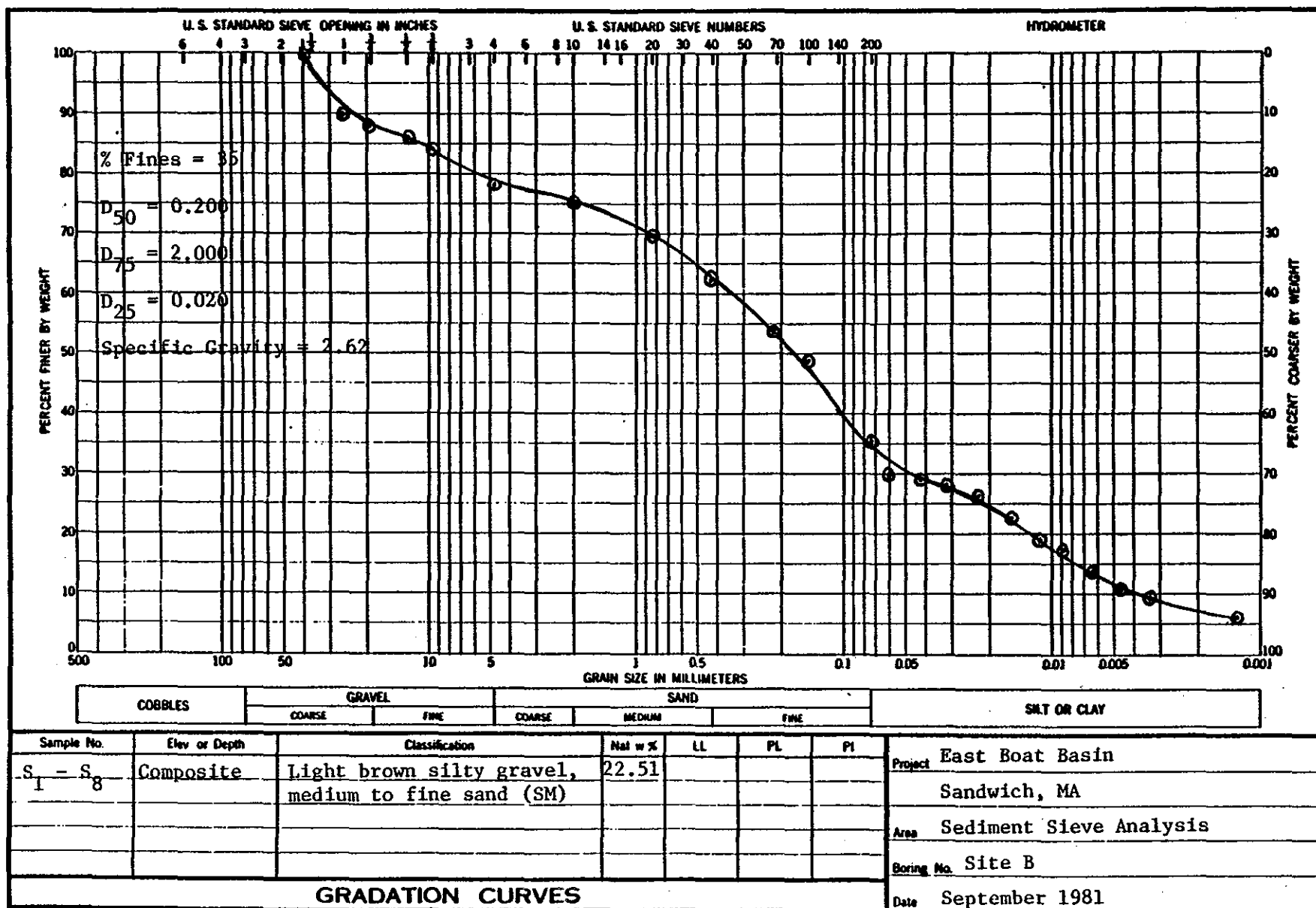
1. Town of Sandwich, Sanitary Landfill -- The sanitary landfill is located along the east side of Route 130 about one mile south of the town center. A small amount of the project material could be trucked from the East Boat Basin for use as cover material at the landfill.

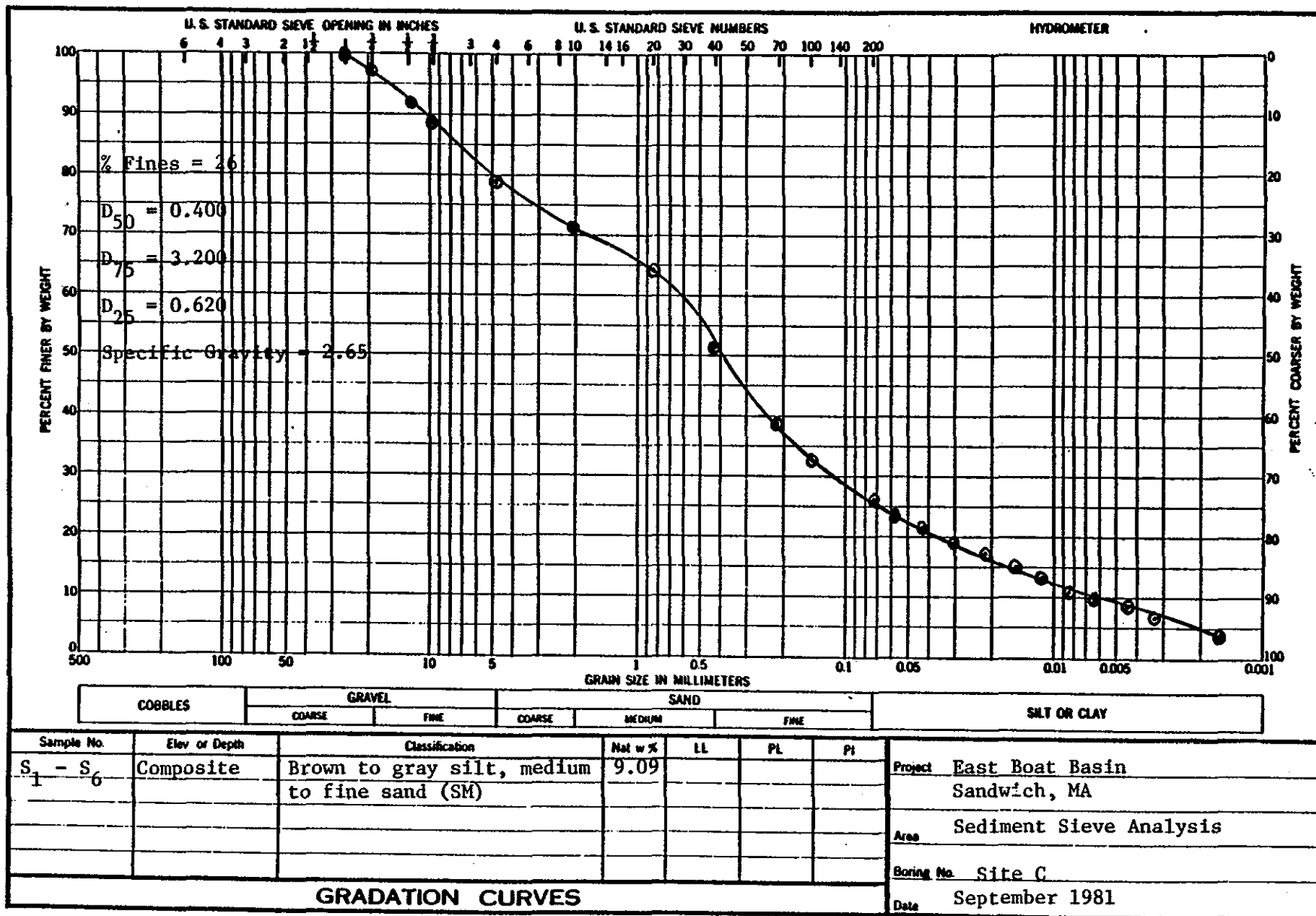


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FIGURE 1-2

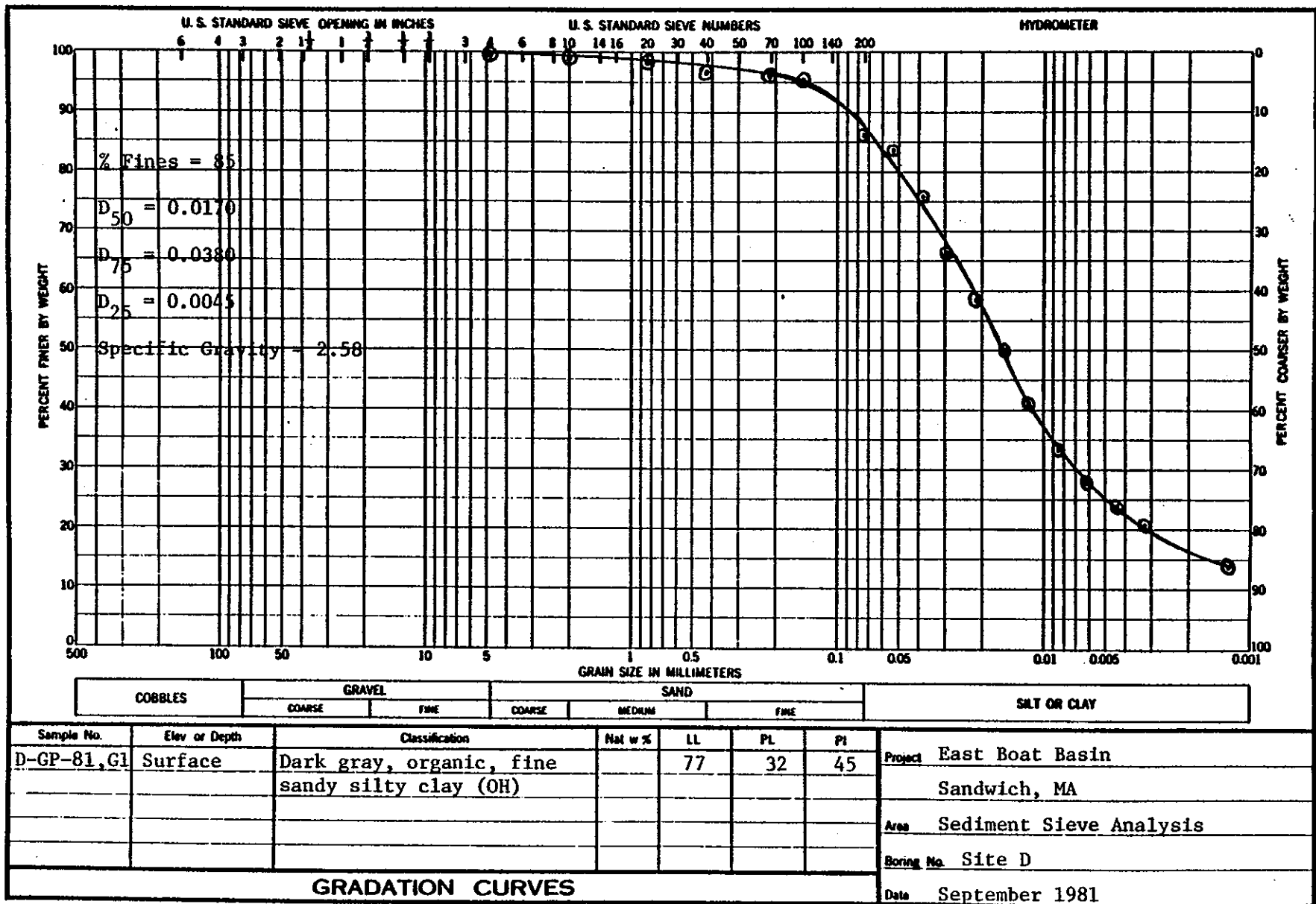




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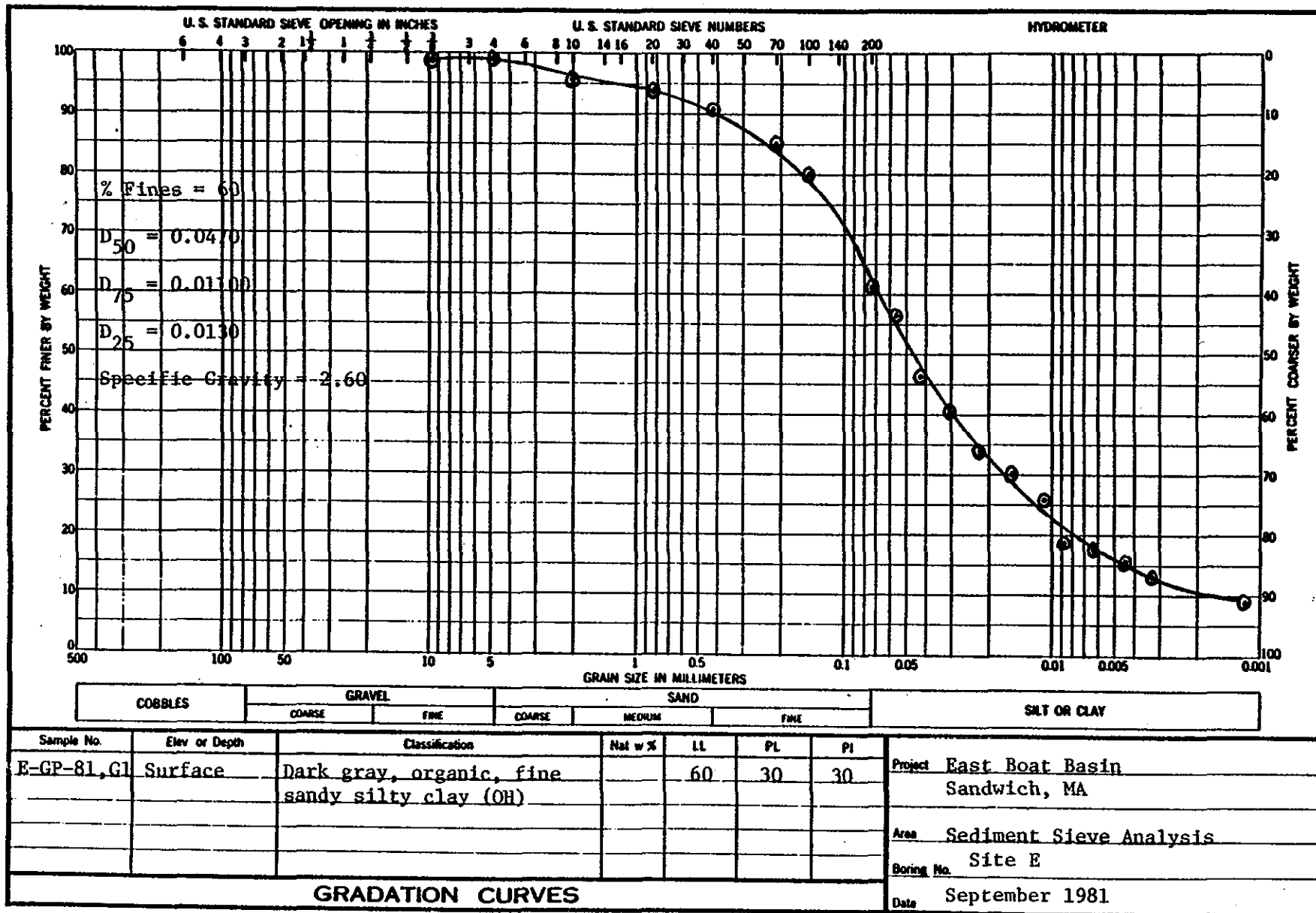
FIGURE 1-4



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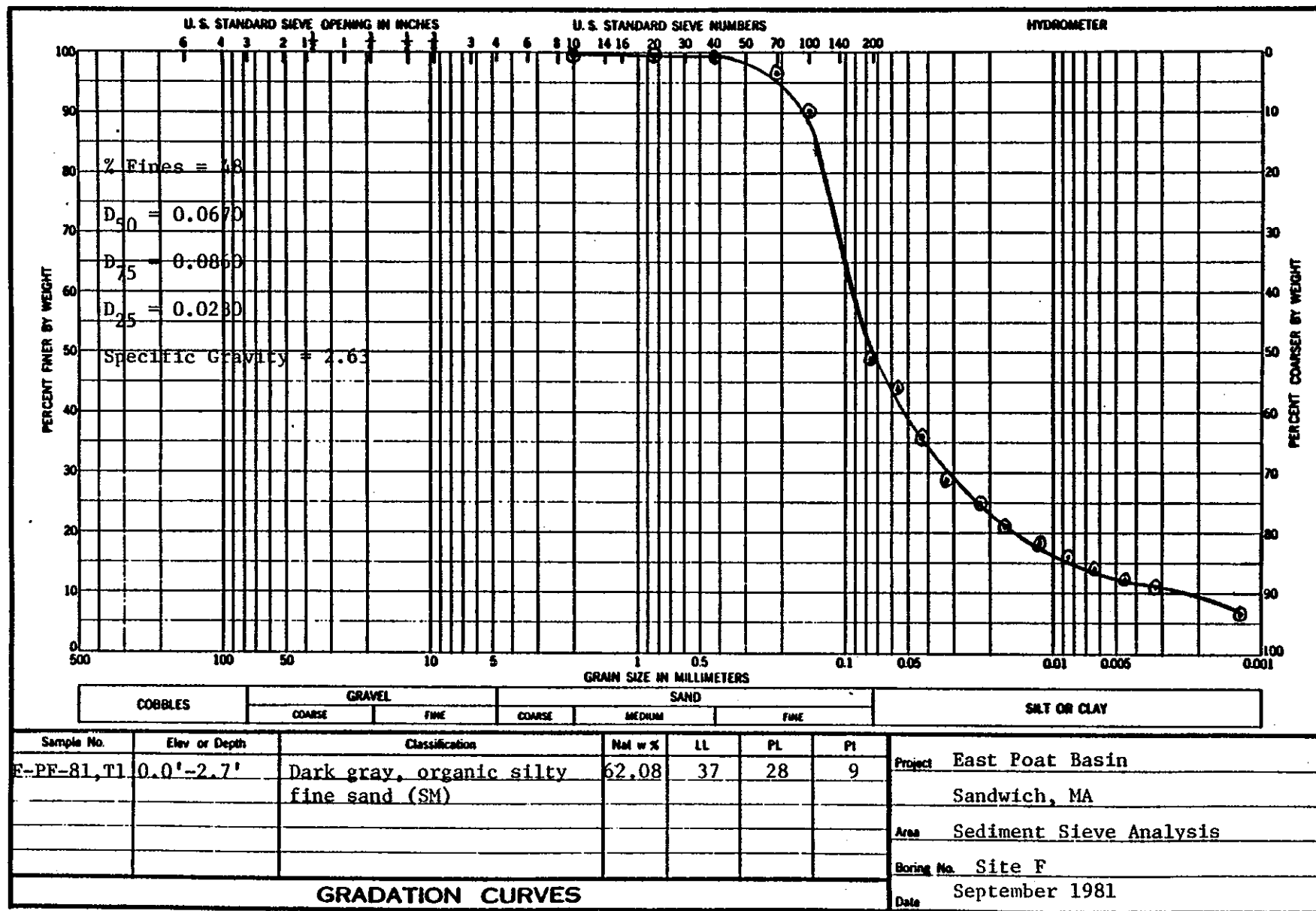
FIGURE 1-5



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FIGURE 1-6



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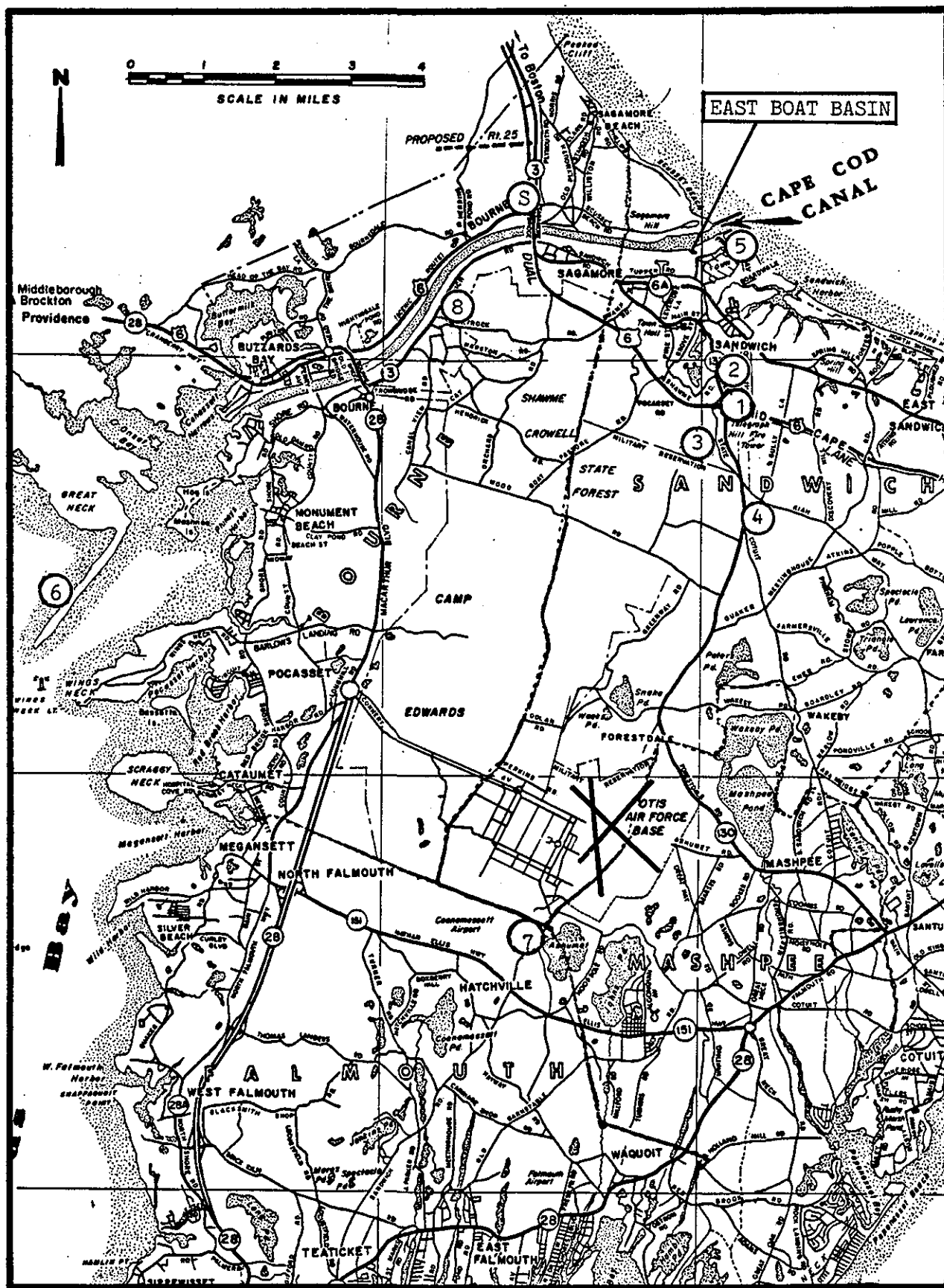


FIGURE 1-8 Upland Disposal Site Locations

2. Depression North of the Sandwich Sanitary Landfill -

This area, immediately adjacent to the present landfill area is a large forested bowl with steep slopes. The north side of the bowl consists of a ridge overlooking Cape Cod Bay that has a private residence located on top with access from Route 130. Ownership of the depression is divided between the town of Sandwich and the ridgetop resident, with the boundary running through the bottom of the depression. A small wetland area is also located at the bottom. A rough capacity estimate indicated that about 300,000 cubic yards of material could be placed in the depression.

3. Camp Edwards Military Reservation - Camp Edwards

Military Reservation abuts the town of Sandwich to the southwest. A large valley-like area is located on the east side of the reservation just south of the Mid Cape Highway and Route 130 interchange. Access to this area is available from Route 130. This forested area would easily accommodate all material generated by the project.

4. Stump Dump on Route 130 - A privately owned stump dump

and gravel pit area about one mile south of the sanitary landfill along Route 130, was considered. The project material could be stockpiled and used for cover material, in the disposal of tree stumps.

5. Sandwich Town Neck Beach - This beach, located south of

the eastern Cape Cod Canal entrance has lost much of its material due to hydrodynamic processes. The possibility was explored, to place suitable

project material on the beach, which is just over a half-mile away from the East Boat Basin.

6. Stony Point Dike, Wareham - This disposal alternative was identified by the U.S. Fish and Wildlife Service. The Stony Point Dike is located in Buzzards Bay about 10 miles to the southwest of the basin. All of the material could be placed on the inland side of the dike for creation of tidal flat or saltmarsh.

7. Crane Wildlife Management Area - This disposal alternative was also identified by the U.S. Fish and Wildlife Service. This area is located south of Otis Air Force Base, about 16 miles from the East Boat Basin. Project material would be deposited at a former gravel pit located in the management area.

8. Corps of Engineers Gravel Pit at Canal Midway Station - This site was also identified by the U.S. Fish and Wildlife Service, as a potential site for a public demonstration of habitat restoration using project material. Material would be placed at the gravel pit which is about 4 miles from the basin, and new habitat developed on top of it.

9. Disposal in "404" Waters - Environmental test data indicates that the material is satisfactory for disposal into "404" waters, or coastal waters located landward of the territorial sea baseline. Project material would be barged to a disposal site in either Cape Cod Bay or Buzzards Bay.

10. Ocean Disposal - The nearest approved ocean disposal site is the Foul Area, located about 50 miles to the north in Massachusetts Bay. Environmental test data indicates that disposal of project material at the Foul Area is acceptable.

SCREENING OF DISPOSAL SITES

Upon completion of identification of alternative disposal sites, they were screened to narrow the range of alternatives to those most feasible. State and Federal resource agencies, and local interests were solicited for their views regarding the suitability of disposal options. The resource and regulatory agencies listed below provided their initial comments as summarized on Table 1-6. Letters from which comments were obtained, and also comments from various local interests are contained in Appendix 3, Public Views and Comments.

Federal Agencies

1. USFWS - U.S. Fish and Wildlife Service
2. EPA - Environmental Protection Agency
3. NMFS - National Marine Fisheries Service

Table 1-6

Resource and Regulatory Agency Comments - Disposal Options

<u>Disposal Options</u>	<u>USFWS</u>	<u>DEQE DMPC</u>	<u>EPA</u>	<u>CZM</u>	<u>NMFS</u>	<u>DEQE DWP</u>
1. Sanitary Landfill	No comment	No comment	No comment	No comment	Investigate further.	Good potential disposal site. Would not impact public water supply.
2. Depression	Destruction of forest habitat.	No comment	No comment	Negative environmental impact.	No comment	Good potential disposal site. Would not impact public water supply.
3. Camp Edwards	Destruction of forest habitat.	No comment	Investigate further. Limited environmental impact.	Evaluate further. Little environmental benefit. Minimal Environmental impact.	Investigate further.	Questionable. May be upgradient of town's gravel packed well.
4. Stump Dump	Potential for habitat mitigation.	No comment	No comment	No comment	Investigate further.	Questionable. May be upgradient of town's gravel packed well.
5. Town Neck Beach	No comment	Use for beach nourishment.	Investigate further.	Negative environmental impact.	No comment	Sediments do not appear to be of appropriate grain size distribution.
6. Stony Point Dike	First choice. Tidal flat or saltmarsh creation. Habitat replacement.	No comment	Create tidal salt-marsh. Environmental benefit. Habitat mitigation.	Marsh creation preferred priority. Environmental benefit.	No comment	Acceptable alternative. Must result in beneficial habitat creation to warrant serious consideration.
7. Crane Wildlife Management Area - Gravel Pit	Low priority, dedicated to conservation and wildlife management.	No comment	No comment	Precludes existing use.	No comment	Inappropriate for disposal of marine sediments. Potential chloride contamination of freshwater system.
8. Corps of Engineers Gravel Pit	Potential for public demonstration of habitat restoration.	No comment	No comment	Precludes existing use.	No comment	Best upland site. Minimal impact on groundwater.
9. "404" Waters	No comment	Material approvable for disposal into Commonwealth waters.	No comment	Disposal in Cape Cod Bay not likely at present. MEPA EIR to be completed first.	Negative impact to inshore fishery resource.	May be appropriate. Further sediment testing required.
10. Ocean Disposal	Object if disposal criteria not met. Recommend biological testing.	No comment	Acceptable for ocean disposal.	Potential alternative subject to ocean dumping criteria.	Preferred over near shore disposal. Less desirable than upland disposal. Possible cap for Foul Area.	Probably not feasible due to cost of transporting to the Foul Area. Additional testing necessary.

State Agencies

1. DEQE - Department of Environmental Quality Engineering
 - a. DWPC - Division of Water Pollution Control
 - b. DWP - Division of Wetland Protection
2. CZM - Coastal Zone Management

One additional disposal alternative was identified through coordination with the National Marine Fisheries Service in response to the requests for comments on the identified disposal options. A Sagamore businessman owns several low areas in the vicinity of the traffic rotary north of the Sagamore Bridge. He is looking for fill material at no cost to himself. Material from the East Boat Basin could be trucked to these sites across the Sagamore Bridge. This became the eleventh disposal option, and is identified by the letter "S" on Figure 1-8.

Based on the agency comments, and additional information coming to light during the progress of the study, the range of disposal options was narrowed in order to retain the most viable options. Rationale for retention or elimination of each disposal option is discussed below.

1. Town of Sandwich Sanitary Landfill - This disposal option is not viable since the time frame of the expansion project would not coincide with the need for cover material. As discussed with the Town Engineer, the landfill would be approaching its maximum capacity and could

only take a small amount of material. Therefore, this disposal option was dropped from further consideration.

2. Depression North of the Sandwich Sanitary Landfill - The Town Engineer contacted the owner of the property abutting the town's property, regarding disposal of project material at this location. A negative response was indicated, which would cause difficulty in securing the site. In addition, resource agencies expressed concern over potential negative environmental impacts. This site was eliminated from further consideration.

3. Camp Edwards Military Reservation - The Directorate of Facilities Engineering has indicated that disposal of excavated project material is not desired at Camp Edwards. Therefore, this disposal site was eliminated from further study.

4. Stump Dump on Route 130 - Discussion with the Town Engineer indicated that the site will be developed into a soft drink production facility. Therefore, it was dropped from further consideration.

5. Sandwich Town Neck Beach - No clear consensus by resource agencies was obtained concerning the viability of this disposal option. Based on gradation curve analyses, most of the material does not appear appropriate for beach nourishment. This disposal option was

eliminated from further consideration as the selected disposal option. However, the possibility exists for the town to take some project material suitable for beach nourishment during the construction process, for placement on Town Neck Beach, should the appropriate circumstances take place.

6. Stony Point Dike, Wareham - Disposal of project material and creation of saltmarsh behind the Stony Point Dike appeared to be the most desirable disposal alternative from an environmental point of view, as expressed by a majority of State and Federal resource agencies. However, solicitation of local views regarding this disposal alternative resulted in vigorous opposition. Major concerns expressed by local interests included further siltation of the bay, negative impacts to the shellfish propagation program, damage to the dike which is a nesting area for birds, potential release of pollutants from project material, and damage to Wareham roads. Based on this local opposition, this disposal alternative was dropped from further consideration.

In addition to local opposition, cost was also a major consideration. The Stony Point dike was among disposal sites farthest from the project site, thereby yielding a relatively high cost for transportation of the project material. The protective dike structure and marsh creation would incur substantial additional costs making this disposal alternative the most expensive of all.

Subsequent coordination with the U.S. Fish and Wildlife Service has indicated that this area is a substantial quahog resource, and they now do not recommend that project material be deposited behind Stony Point Dike.

7. Crane Wildlife Management Area - The consensus of resource agencies indicated that this site was not desirable for material disposal because of its dedication to conservation and wildlife management, and potential chloride contamination of the freshwater system. The U.S. Fish and Wildlife Service has subsequently indicated that this site would be a preferred disposal location for disposal of excavated material, assuming no risk of chloride contamination. However, since the upland portion of the proposed project contains material from the 1963 expansion project, and it is subject to tidal influences, the probability of chloride content is considered high. Therefore, this disposal alternative was dropped from further consideration.

8. Corps of Engineers Gravel Pit at Canal Midway Station - Several resource agencies indicated that this site would be a good location for placing project material, since it would have the least impact on aquifers that supply area municipalities with water. However, discussions with the Corps of Engineers, Cape Cod Canal Office, indicate that this location is not recommended. The gravel pit is actively used to obtain bank run material for various purposes at the Cape Cod Canal project. Disposal of material at the gravel pit would preclude the existing use. Also, leachate from the material could impact a well providing potable water for the nearby public use area. Therefore, this disposal alternative was eliminated from further consideration.

9. Disposal in "404" Waters - Three open-water disposal sites within "404" waters were considered; the Wellfleet site about 7 nautical miles west of Wellfleet Harbor in Cape Cod Bay, the Cape Cod Canal site in Cape Cod Bay, located about four nautical miles northeast of the eastern end of the Cape Cod Canal and the Buzzards Bay site just south of Cleveland Ledge.

The Commonwealth of Massachusetts Coastal Zone Management Agency has indicated that disposal of project material in Cape Cod Bay may not be possible until after an Environmental Impact Report has been prepared under the Massachusetts Environmental Protection Act (MEPA) by the state MEPA office, which will lead to a formal designation of a Cape Cod Bay disposal site. This process is currently underway and may not be completed for several years. Based on this indication that no dumping take place in Cape Cod Bay until studies have been completed, the Wellfleet site and Cape Cod Canal site were eliminated from further consideration. Should a Cape Cod Bay site be designated prior to construction, it would again be given consideration.

Disposal of the project material at the Buzzard's Bay site is not considered desirable. Disposal of the large volume (up to 600,000 cubic yards) of project material would substantially raise the relatively shallow (25' - 30') existing bottom elevation and pose a hindrance to navigation. Also, this site is presently the only active site available in the area, and the dumping of project material here would preclude its

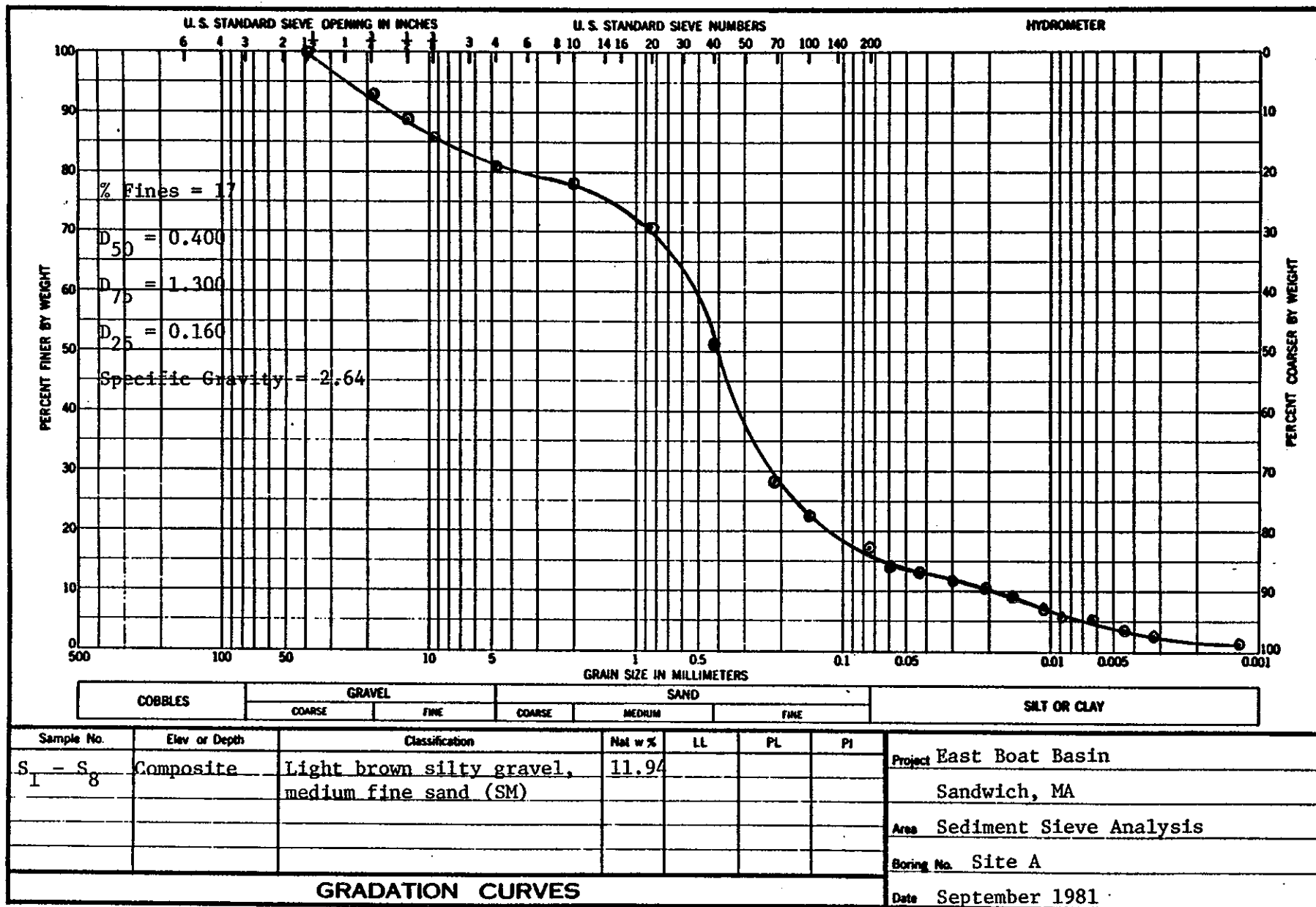
availability for the many small projects that are expected to use this location for disposal of dredged material. For the above reasons, the Buzzard's Bay site was dropped from further consideration.

10. Ocean Disposal - All Federal resource agencies have indicated that this alternative is acceptable. The U.S. Environmental Protection Agency has informed us that, based on available bulk sediment test results, the project material is considered acceptable for ocean disposal. The National Marine Fisheries Service prefers that the material be discharged into ocean waters rather than near-shore waters. They feel the material can be used to cover more contaminated materials previously dumped at the Foul Area. Ocean disposal was therefore retained as a viable disposal alternative, with the Foul Area being the identified disposal site.

11. Sagamore Site - There is a high probability that the excavated project material will have some chloride content, which could leach out at an upland disposal site. Disposal at the Sagamore site is not recommended since the adjacent down-gradient watershed area, owned by the North Sagamore Water District, would be highly sensitive to chloride contamination. Therefore, this site was eliminated from further consideration.

CONCLUSIONS

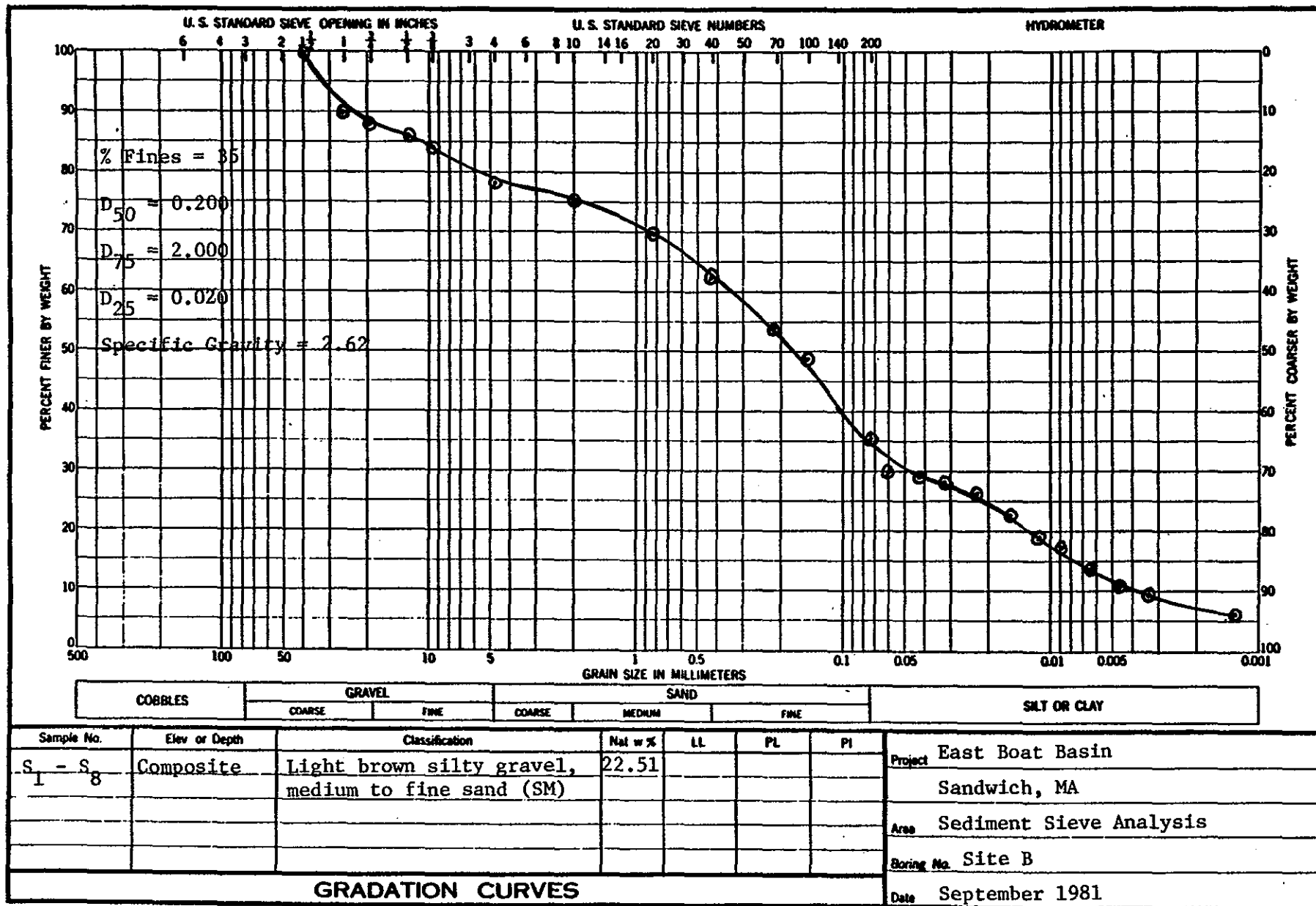
The results of the disposal alternative screening process indicate that only one disposal site would be viable at this time. Disposal of project material at the Foul Area in Massachusetts Bay was selected as the recommended disposal site. Should things change between this point in time and the project construction time, and a more suitable disposal alternative comes to light, then the material disposal strategy for the project would be subject to change.



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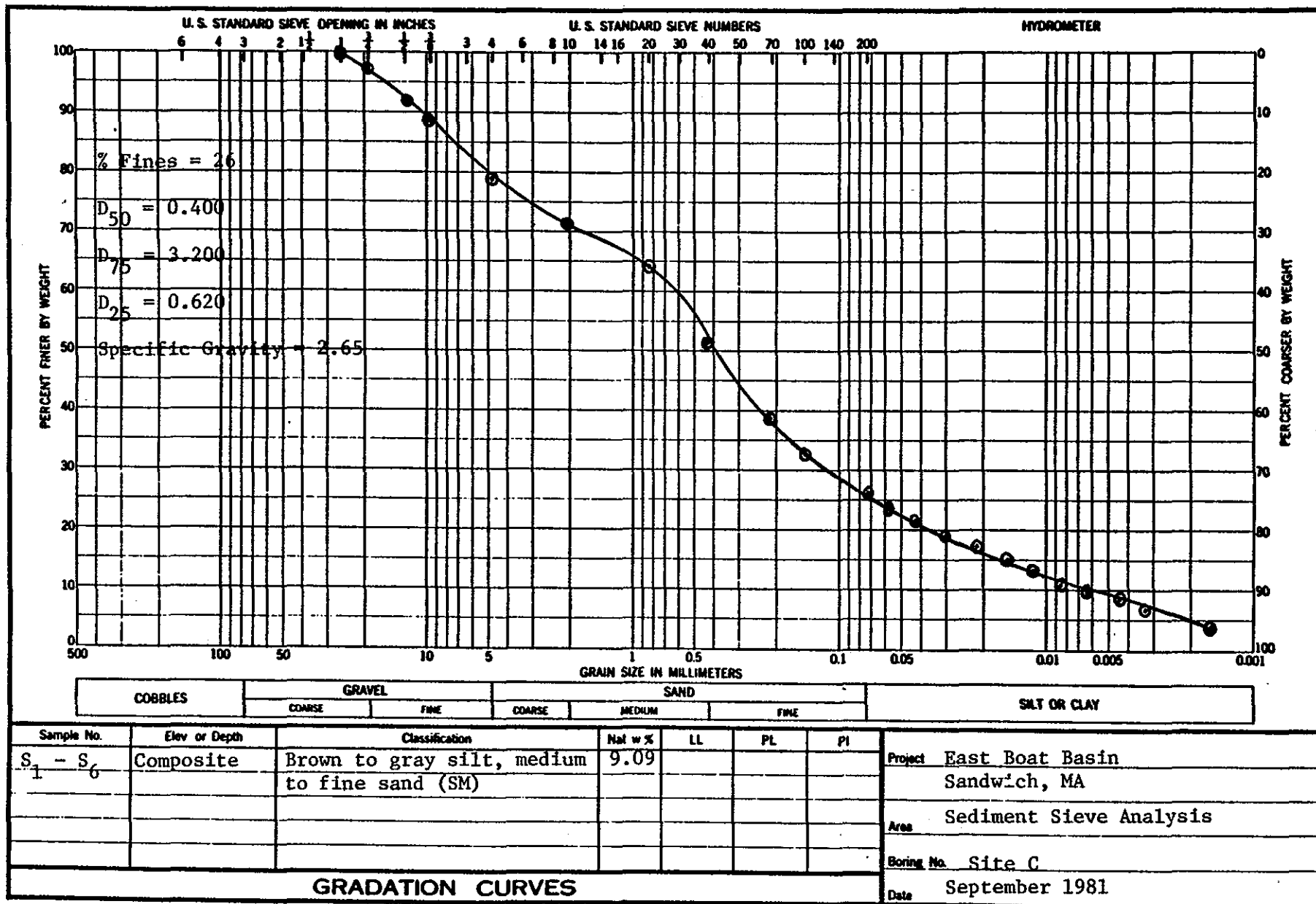
FIGURE 1-2



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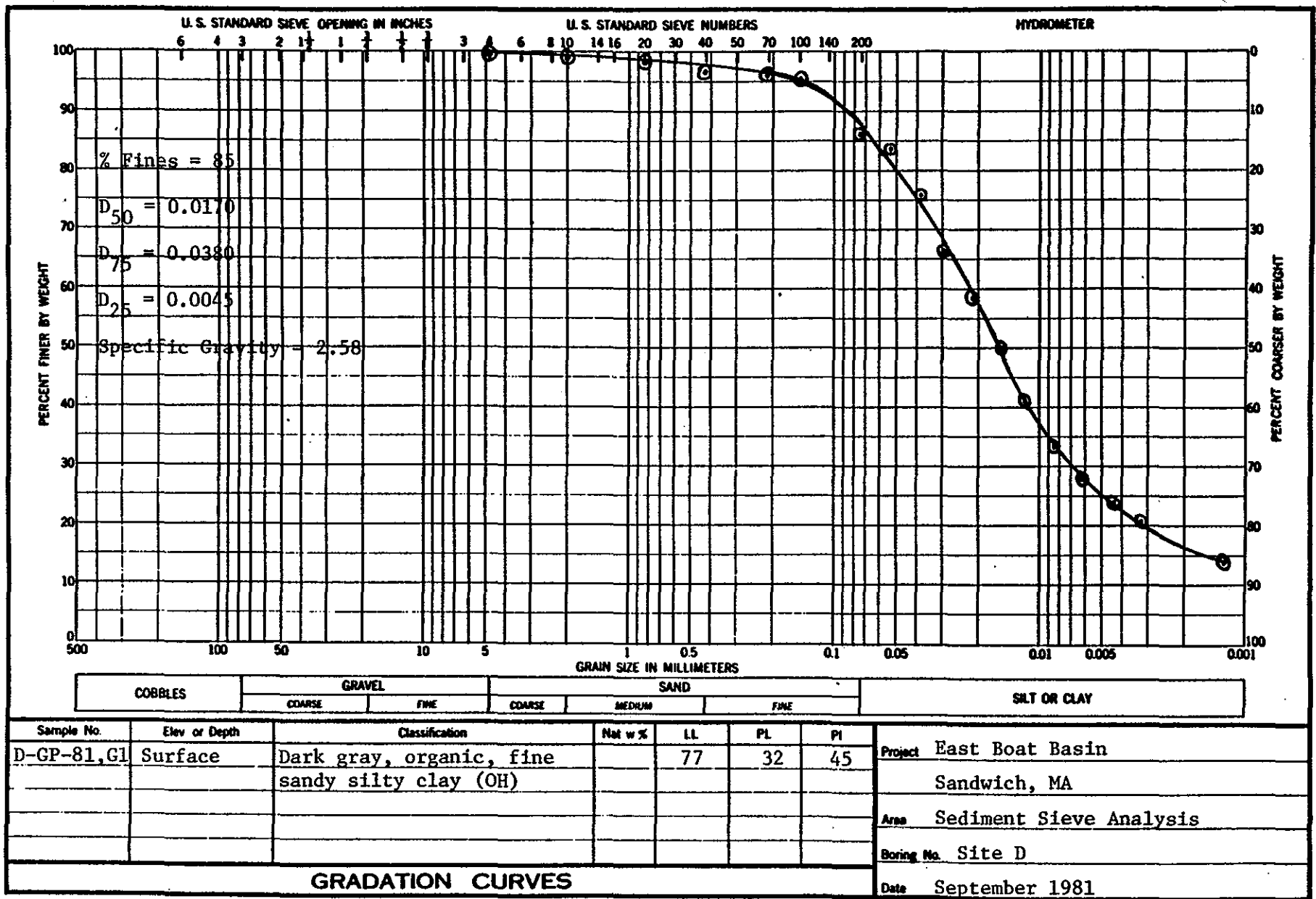
FIGURE 1-3



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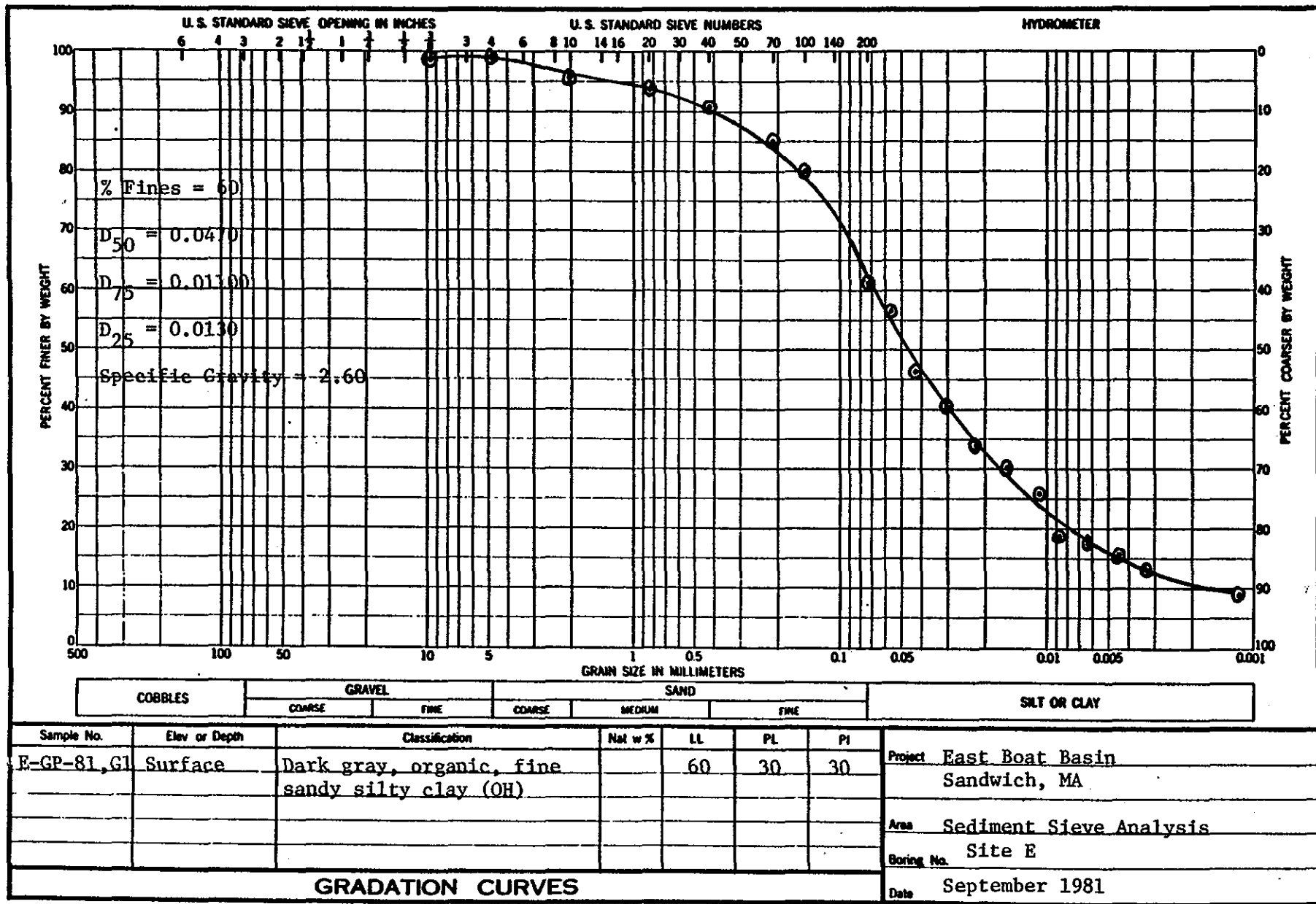
FIGURE 1-4



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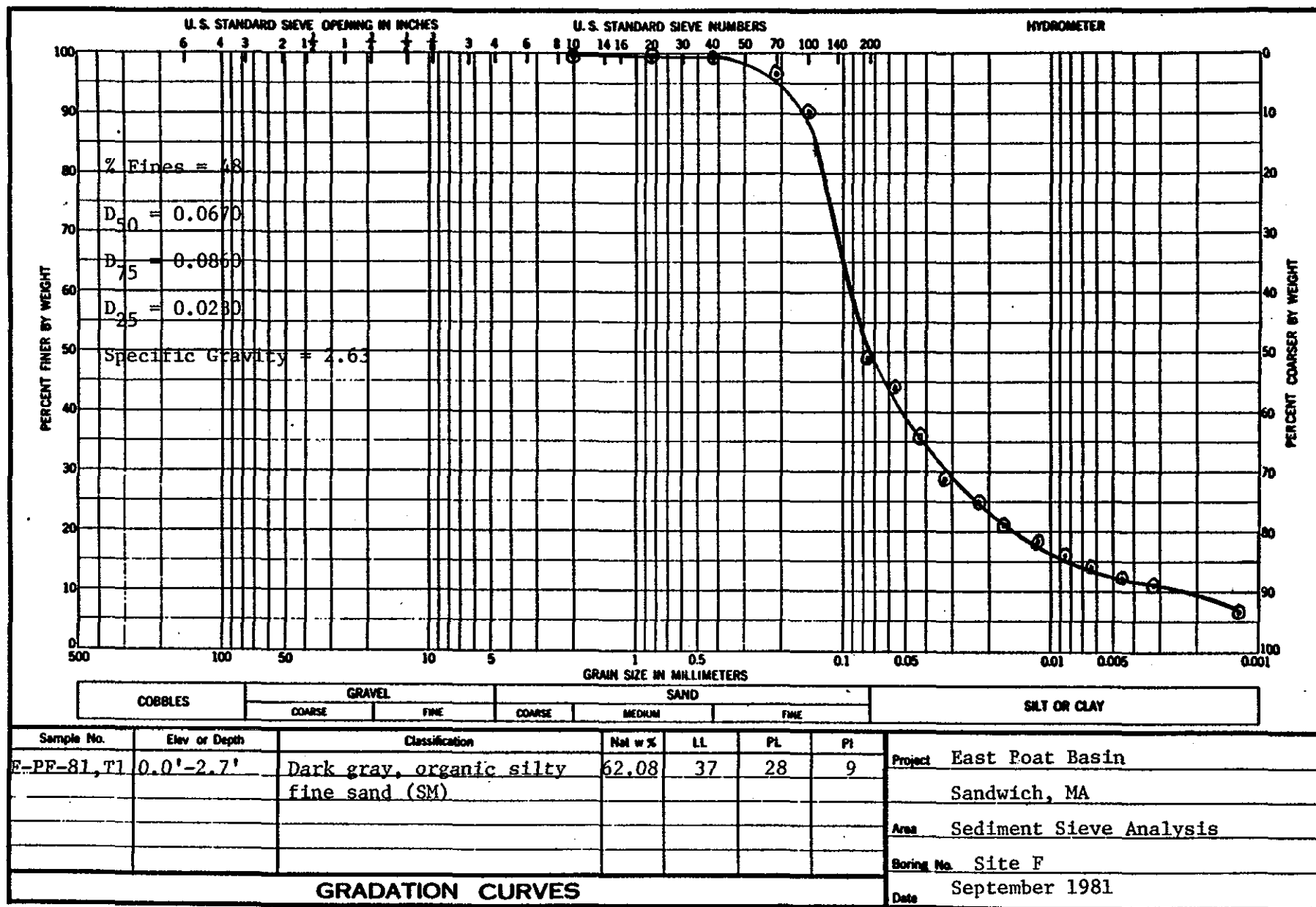
FIGURE 1-5



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FIGURE 1-6



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FIGURE 1-7

Table 1-6

Resource and Regulatory Agency Comments - Disposal Options

<u>Disposal Options</u>	<u>USFWS</u>	<u>DEQE DWPC</u>	<u>EPA</u>	<u>CZM</u>	<u>NMFS</u>	<u>DEQE DWP</u>
1. Sanitary Landfill	No comment	No comment	No comment	No comment	Investigate further.	Good potential disposal site. Would not impact public water supply.
2. Depression	Destruction of forest habitat.	No comment	No comment	Negative environmental impact.	No comment	Good potential disposal site. Would not impact public water supply.
3. Camp Edwards	Destruction of forest habitat.	No comment	Investigate further. Limited environmental impact.	Evaluate further. Little environmental benefit. Minimal Environmental impact.	Investigate further.	Questionable. May be upgradient of town's gravel packed well.
4. Stump Dump	Potential for habitat mitigation.	No comment	No comment	No comment	Investigate further.	Questionable. May be upgradient of town's gravel packed well.
5. Town Neck Beach	No comment	Use for beach nourishment.	Investigate further.	Negative environmental impact.	No comment	Sediments do not appear to be of appropriate grain size distribution.
6. Stony Point Dike	First choice. Tidal flat or saltmarsh creation. Habitat replacement.	No comment	Create tidal salt-marsh. Environmental benefit. Habitat mitigation.	Marsh creation preferred priority. Environmental benefit.	No comment	Acceptable alternative. Must result in beneficial habitat creation to warrant serious consideration.
7. Crane Wildlife Management Area - Gravel Pit	Low priority, dedicated to conservation and wildlife management.	No comment	No comment	Precludes existing use.	No comment	Inappropriate for disposal of marine sediments. Potential chloride contamination of freshwater system.
8. Corps of Engineers Gravel Pit	Potential for public demonstration of habitat restoration.	No comment	No comment	Precludes existing use.	No comment	Best upland site. Minimal impact on groundwater.
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10. Ocean Disposal	Object if disposal criteria not met. Recommend biological testing.	No comment	Acceptable for ocean disposal.	Potential alternative subject to ocean dumping criteria.	Preferred over near shore disposal. Less desirable than upland disposal. Possible cap for Foul Area.	Probably not feasible due to cost of transporting to the Foul Area. Additional testing necessary.

TABLE 2

Soil Description	<u>Composite of East Boat Basin Sediments/Materials</u>		<u>Foul Area Sediments</u>			<u>Various Harbors Throughout the Gulf of Maine Tidal System 1969 to 1980</u>	
	<u>(dredge area)</u>	<u>(excavation area)</u>	<u>NEA Composite(1975)</u>	<u>NUSC/DAMOS (1978)</u>	<u>SAI/DAMOS (1982)</u>	<u>mean</u>	<u>mean plus one SD</u>
	organic silty clay and sand	medium/fine sand	silty clay	-	sandy silty clay		
% Vol Solids	3.2	.93	7.62	17.65	4.34	4.37	9.36
Oil & Grease*	901.8	< 41	940	ND	-	2532	6361
Mercury	< .07	< .08	0.59	.24	.14	.57	1.78
Lead	< 65	< 30	60.94	52	94	83.2	184
Zinc	117.3	95.7	140.44	92.5	208.6	134.5	285.5
Arsenic	7.2	< 2.05	13.25	-	13.14	6.98	14.64
Cadmium	< 3	< 3	3.43	.44	ND	3.12	9.37
Chromium	< 59	< 30	73.75	87	43.9	112	337.4
Copper	34	< 10	21.13	21.4	40.7	83.2	212.6
Nickel	< 40	< 40	37.56	33.5	31.3	36.3	64
Vanadium	< 200	< 200	53.69	-	ND	60.9	119.8
PCB's	< .005	< .005	-	-	ND	.61	1.65

* All concentrations, except for volatile solids are expressed in ppm
 ND denotes concentrations below laboratory detection limits

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

APPENDIX 2

FORMULATION, ASSESSMENT AND EVALUATION OF PLANS

Prepared by the
New England Division, Corps of Engineers
Department of the Army

FORMULATION, ASSESSMENT AND EVALUATION OF PLANS

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FORMULATION, ASSESSMENT AND EVALUATION OF PLANS

This appendix provides the plan formulation rationale that led to the recommendation of a selected plan of improvement.

FORMULATION AND EVALUATION CRITERIA

Detailed technical, economic and environmental criteria were utilized in the formulation and evaluation of alternative plans. The criteria provided a means of measuring each plan's performance against the established planning objectives. The various criteria are described below.

TECHNICAL CRITERIA

The technical criteria are as follows:

- Navigation feature dimensions (length, width and depth) should be adequate for the types of vessels expected to use the harbor.
- Alternative plans should propose the most efficient and desirable berthing/mooring system, to allow for maximum use of the expanded basin.
- Provide adequate clearance between the entrance channel and the west shoreline of the basin to avoid adverse impact on the stability of the west shoreline.

ECONOMIC CRITERIA

The economic criteria are as follows:

- Maximize net benefits (project benefits minus project costs).
- Maximize net benefits to the marine related activities at the basin and to the town of Sandwich.
- Minimize adverse construction impacts on existing development, thereby reducing construction costs.
- Minimize project costs by recommending less costly project features that adequately provide the required function.
- Minimize local onland development costs by recommending basin configurations that are consistent with local development plans.

ENVIRONMENTAL AND SOCIAL CRITERIA

The environmental and social criteria are as follows:

- Minimize the volume of material to be removed in order to reduce problems related to disposal of material.

- Maximize the beneficial use of material to be removed.
- Minimize adverse impacts on fish and wildlife resources.
- Maximize the safety and ease of navigation for both commercial and recreational craft.
- Maximize the cultural and aesthetic value of the harbor.

MANAGEMENT MEASURES

The formulation of alternative plans required the identification of a broad range of management measures to address the study objectives. Management measures are generally categorized as nonstructural or structural improvements.

NONSTRUCTURAL MEASURES

Nonstructural measures are implemented without performing any type of construction. They generally consist of implementing a harbor management plan to make existing facilities more efficient. The following nonstructural alternatives were considered for the East Boat Basin.

Alternative 1: Transfer commercial fishing vessels to other ports.

Commercial fishing vessels could be transferred to other ports, thereby allowing recreational boats to use the entire harbor. Fish offloading would continue to take place along the Cape Cod Canal bulkhead by transient fishing boats. This alternative would provide a good opportunity to address the recreational boating planning objective. However, the possibility of the commercial fishing boats finding space at other ports would be virtually nil, since regional fishing ports are already saturated or lack adequate facilities. In addition, two other factors must also be considered, the reluctance of fishermen to move from their historic port, and the local interest's desire to promote and expand the commercial fishing industry. Implementation of this alternative would be detrimental to the regional fishing industry, would be difficult to implement and would not be consistent with the desires of local interests. This alternative was dropped from further consideration.

Alternative 2: Transfer recreational boats to other ports.

Recreational boats can be transferred to other ports, thereby allowing commercial fishing boats to use the entire basin. This alternative would have the opposite effect by promoting the commercial fishing planning objective. This alternative is potentially implementable since regional recreational boating facilities are generally more available than commercial fishing facilities. The main problem with this scenario is

that the East Boat Basin services a large area with a high density of tourists and vacationers, many of whom use the basin for their boating activities. The nearest recreational harbors are 10 to 20 miles away, which would require substantial travel time when compared to operating out of the East Boat Basin. Demand for recreational boating use at the basin is well evidenced by the 116 boat owners on the active waiting list for berthing space. Based on the need to retain recreational boating opportunity at the East Boat Basin, this alternative was dropped from further consideration.

Alternative 3: Do nothing.

Doing nothing would not alleviate any of the existing problems and needs. Maintenance of the status quo would not provide opportunities to capitalize on the potential expansion of commercial fishing industry or the recreational boating activity. Since doing nothing does not address the planning objectives, it was eliminated from further study.

STRUCTURAL MEASURES

Structural measures consist of some type of construction to enhance existing navigation systems. At the East Boat Basin these measures would include the dredging and excavation of navigation features, construction of slope protection (riprap revetment or bulkhead in conjunction with navigation features), and construction of docks and piers. Implementation

of structural improvements was considered to be the most satisfactory means of addressing the problems and meeting the needs of the commercial fishing and recreational boating activities. Therefore structural measures were carried forward for further consideration.

PLAN FORMULATION RATIONALE

This section of the appendix describes the detailed plan formulation rationale on which the formulation of alternative plans was based.

PROJECTED MAXIMUM FUTURE CONDITION

In order to determine the size of basin expansion required, the maximum level of future activity was determined. Based on information provided by public interests, projections were made concerning the level of fishing industry that could be supported at Sandwich, and also concerning the expected level of future recreational boating activities.

Results of the projection analysis indicate that the Sandwich commercial fishing fleet could increase by about 40 vessels. However, only half would be new boats while the remainder would be transfers from other ports. The 20 new boats would primarily develop the non-traditional fishery (including mostly surf clams and ocean quahogs, and some herring, mackerel, silver hake and squid), but some growth in the traditional fishery is anticipated. The East Boat Basin is also expected to attract

up to 10 charter fishing boats. Including the existing summer fleet, a total future fleet of about 94 vessels could be expected.

Recreational boating activity will also realize future growth. The existing fleet of 100 boats will grow to 142 boats under the without-project condition, as boats on the waiting list are accommodated. The remaining 74 boats on the waiting list would be considered immediate growth under the with-project condition. In addition, future growth of about 114 permanent boats was projected over a period of 10 years based on the projected population growth for Barnstable County. The total future recreational fleet would be about 330 boats comprised of 300 permanent boats and 30 transient boats, assuming a constant level of transient activity.

The projected maximum future condition provides an approximate upper limit on the level of activity that could take place, given the available marine resource and the facilities necessary to support the activities. The activity scenarios discussed above were regarded as the maximum level of each activity that could be supported into the foreseeable future. The projected maximum future condition assists the plan formulation process by capping the degree to which the East Boat Basin could be expanded.

LIMITING FACTORS

As discussed in the Planning Constraints section of the main body, expansion of the basin is limited by the amount of area local interests wish to use for on-land development. About 25 acres of land are available for expansion, including 22 acres of town of Sandwich property and about 3 acres of Federal property adjacent to the existing basin. This area would be divided between the two uses, navigation and onland development.

The prior expansion study performed by the town of Sandwich was used to determine the approximate breakdown of area to be allocated for each use. The study identified the type and number of facilities desired by local interests in conjunction with a basin expansion project. Sufficient land area will be necessary to support the proposed development, which was reflected in the town's study. It indicated the approximate maximum basin expansion while maintaining a desirable level of surrounding development. Under Plan A and Plan B of the town's study, increases in water area of 11.6 acres and 7.9 acres resulted. Therefore, it was assumed that the approximate maximum allowable basin expansion was 11.6 acres, with the remaining area allocated to land development. The limitation of basin expansion placed a constraint on the formulation of plans.

Area requirement analyses determined that about 11.6 acres and 24.4 acres of water area for slip berthing and open mooring respectively, would be needed to accommodate the projected maximum condition. When these

areas are compared to the approximate maximum allowable basin expansion, it can be seen that space requirements for the projected maximum condition cannot be satisfied by the open mooring condition. The slip berthing condition could substantially satisfy the projected maximum condition, considering that riprap slope area rather than bulkhead would increase the actual expansion area beyond 11.6 acres. Therefore, projected fleet growth was dependent on the configuration constraints of alternative plans.

PLANNING OBJECTIVES

Planning objectives were considered to assist in determining the type and degree of improvement that should be formulated. For the East Boat Basin, the first four planning objectives were considered in the formulation of plans specific to the proposed project site. There is great potential for increased commercial fishing activities and the town of Sandwich fully supports development of the industry. There is ample evidence to support major increases in recreational boating at the basin also. Due to the constrained nature of the project site, an adequate navigation system must be proposed. The town also has definite ideas on the type of development desired at the basin and has provided the prior expansion study to be utilized as a tool to express their desires.

Plan formulation was directed towards attempting to satisfy all four of the planning objectives rather than focusing more attention on a lesser

number of the objectives. None of the planning objectives may fully meet the maximum projected condition, but the opportunity exists to substantially achieve all the objectives. Therefore plans were formulated to increase commercial fishing and recreational boating activities on a relatively equal basis, while maintaining a balance between the size of navigation system expansion and the land area required to support the future on-land development desired by local interests.

PLAN FORMULATION

Consideration of available management measures, projected future conditions, planning constraints and planning objectives gave direction to the formulation of plans. Various structural measures were selected for implementation in an improvement project. A range of alternative plans from no expansion to approximate maximum expansion were formulated to compare the resultant impacts of different size plans. Also, various configurations were considered to examine potential impacts due to varying the locations of project components, both water and on land. In order to avoid excessive reorganization of the present infrastructure, all alternatives were formulated to maintain recreational activities on the same side of the basin as at present. Commercial activities would be separated from the recreational activities, and would be located on the east side and/or rear of the expanded basin. Standard engineering criteria were used to properly size the navigation system, and foundation studies were performed to define subsurface conditions for the formulation of slope protection measures.

ANALYSIS OF PLANS CONSIDERED IN PRELIMINARY PLANNING

A group of eight preliminary alternative plans were formulated and analyzed during the intermediate portion of the study. Major emphasis was on the analysis of plans involving excavation/dredging of a landcut to expand the existing basin. However, one plan (Plan H), known as a primarily nonstructural plan, did consider the possibility of increasing uses of the existing basin. The remaining alternative plans examined a range of sizes and various configurations to determine which plan provided the most desirable results. The eight preliminary alternatives are briefly described below.

Description of Plans

Each of the alternative plans included an entrance channel, a turning/maneuvering area, an offloading area for fishing boats, a commercial berthing area and a recreational berthing area. Depths were consistent for all plans as listed below.

Entrance channel - 14 feet below mean low water (MLW)

Turning/maneuvering area - 14 feet below MLW

Offloading area - 14 feet below MLW

Commercial berthing area - 12 feet below MLW

Recreational berthing area - 6 feet below MLW

The basin expansion perimeter would be stabilized and protected with riprap revetment for all plans. Steel sheet pile bulkheading would be used in and around areas where the offloading of fish would take place.

Alternative A - This alternative would provide an increase of 3.4 acres of water area, which is the least expansion of all the alternatives. The central entrance channel would separate the commercial berthing area from the recreational berthing area and would terminate at a turning/maneuvering area. This area would be adjacent to, and provide access to, fish offloading areas at the back of the basin.

Alternative B - This alternative would provide a rectangular expansion of 7.6 acres of water area extending parallel to Gallo Road. The entrance channel alignment and location of plan features with respect to each other would be similar to Alternative A.

Alternative C - The basin water area would increase by 8.8 acres under this alternative. Again, the channel alignment and location of plan features would be similar to Alternatives A and B. The east rear corner of the expansion would be inverted to provide space for placement of offloading facilities.

Alternative D - In Alternative D a different basin expansion configuration was considered. The fish offloading areas would be located in the center of the basin along the east side. The entrance channel

follows the same alignment as previous plans, providing access to maneuvering/turning areas and berthing areas that are located further inside the basin. The increase in water area would be 9.3 acres.

Alternative E - Alternative E is exactly the same as Alternative B, except that the expanded basin extends farther back. The increase in water area would be 9.7 acres.

Alternative F - This alternative is similar to Alternative D in that the offloading areas are also located along the east side in the center of the basin. The entrance channel alignment swings adjacent to the offloading area, providing access to the commercial berthing area further into the basin and the adjacent recreational berthing area west of the channel. The increase in water area would be 10.1 acres.

Alternative G - This alternative examined an entirely different expansion configuration than all previous plans. A split-basin configuration which provides separate water areas for commercial fishing and recreational boating was considered. A peninsular land area would separate the two areas and would have marine service facilities located on it. The entrance channel would open up to a large maneuvering area which provides access to the two areas. The total increase in water area would be 8 acres.

Alternative H - Alternative H examined the possibility of making the existing basin more usable. An entrance channel and turning/maneuvering area would be constructed to provide access to a bulkhead area at the back of the basin for fish offloading. A rack storage facility for recreational boats would also be incorporated into this alternative.

Comparative Assessment and Evaluation of Plans

Evaluation of the preliminary alternative plans determined that all plans were economically feasible. Computation of annual net benefits indicated that the larger plans generated substantially more benefit than smaller plans. Plan G, the split-basin configuration, was among the larger plans; however, it was not as economically feasible as open-basin configurations, since its requirement for two separate channels and large maneuvering area, would reduce the total berthing space available for new boats. The cost of alternatives also increase with size, so that a tradeoff exists between project cost and level of benefit generated.

The major environmental impact associated with the proposed project is the problem of material disposal. The disposal problem increases as project size increases, with the major impact being one of quantity. Environmental test results determined that material quality is good in terms of grain size and chemical content.

Socioeconomic impacts would also increase with increases in plan size: e.g., more jobs, more economic benefit to the town and more truck traffic emanating from the East Boat Basin. The various basin configurations affect the location of plan features, thereby impacting future traffic patterns of the area. Some configurations may be more consistent with local desires than others. An impact that would pose problems in implementing smaller plans is the possibility of insufficient berthing space to relocate larger boats displaced due to construction of the expansion.

Conclusions

The assessment of impacts showed that the degree to which planning objectives are achieved depends on how much the basin is expanded. Larger plans address the planning objectives to a greater extent than smaller plans, except in the case of the environmental objective. More material must be disposed of for the larger plans; however, beneficial use of the material could greatly minimize adverse environmental impacts.

The screening of preliminary alternative plans was primarily based on economic criteria and input from local interests. Maximization of net benefits, which is consistent with National Economic Development (NED) policies, was used to quantify and measure the degree to which the first two planning objectives were met. Local interests provided input to assure that the study of detailed plans would be consistent with local desires.

Based on the above screening criteria alternatives B, D, E and F were selected for further detailed evaluation, and were redesignated as Plans A, B, C and D.

REITERATIVE FORMULATION

Conclusion of the preliminary evaluation process resulted in the retention of four alternative plans for detailed study. The plans were then reexamined to determine if any reformulation would be necessary. Discussions with local interests and reconsideration of project elements indicated that minimal changes and refinements should be made to the remaining alternatives prior to detailed evaluation.

Changes and refinements were primarily associated with the dimensioning of navigation features. The entrance channel at the basin entrance was widened to assure safe navigation in this critical area. The size of turning/maneuvering areas and berthing areas were refined as necessary. Based on discussions with the Sandwich harbormaster the proposed depth of recreational berthing areas was increased from 6 feet to 8 feet below mean low water. Minor changes in basin configuration and location of bulkheading were made to make plans more efficient and/or less costly.

DESCRIPTION, ASSESSMENT AND EVALUATION OF DETAILED PLANS

This section of the appendix describes the four alternative plans that were carried forward from preliminary planning. The alternatives were then assessed and comparatively evaluated as a basis for selection of a recommended plan.

DESCRIPTION OF PLANS

All of the detailed plans would expand the existing basin by excavating/dredging a landcut into the parcel of land owned by the town of Sandwich. The plans differ mainly in the perimeter configuration and location of navigation features, and somewhat in size. Each plan includes an entrance channel, a turning/maneuvering area, offloading areas for fishing boats, a commercial berthing area and a recreational berthing area. Depths for the navigation features are consistent for all plans as listed below.

Entrance channel - 14 feet below mean low water (MLW)

Turning/maneuvering area - 14 feet below MLW

Offloading area - 14 feet below MLW

Commercial berthing area - 12 feet below MLW

Recreational berthing area - 8 feet below MLW

A multiple-use two-way entrance channel would be constructed through the existing basin to provide access to the basin expansion. The channel width at the basin entrance would be 180 feet, with the east channel line tying into the existing bulkhead. Under the proposed Corps of Engineers bulkhead rehabilitation/replacement project, the bulkhead on the east side of the basin entrance will be replaced with riprap revetment. If this project has been implemented prior to the expansion project, then the new riprap slope would be moved back to make room for the channel. The entrance channel would extend about 400 feet into the basin at the 180 foot width, and then transition into a 120 foot wide channel. The channel alignment would be the same for all plans to this point.

Riprap revetment would be used to protect most of the basin expansion perimeter, with steel sheet pile bulkhead proposed in and around fish offloading areas. The top elevation for riprap slopes and bulkhead was set at 11 feet NGVD (National Geodetic Vertical Datum), which is about 15 feet MLW. This elevation is satisfactory for offloading fishing boats along bulkhead areas. For purposes of the navigation project, slopes were carried back to existing grade on a 1 vertical to 2 horizontal slope.

Two harbor management measures would be incorporated into each plan including separation of navigation activities and the use of rack storage for small recreational boats.

The without-project condition has recreational boats and commercial fishing vessels berthed on both sides of the existing basin in order to maximize the use of available space. However, under the proposed expansion project the two activities would be separated to avoid potential conflicts and inconveniences. This would be consistent with the separation of landward facilities for each activity, which is organizationally more efficient. Therefore, all plans propose separate areas for each navigation activity, generally separated by the entrance channel.

The town of Sandwich also wishes to incorporate rack storage of recreational boats into an expansion project. A rack storage facility for 120 boats up to 25 feet in length was proposed by the town's study. Therefore, this feature would be included in an overall harbor project. It was assumed that rack storage would help satisfy the demand for small boat storage, leaving the expansion project for larger craft.

Differences among the detailed plans are further described in the following sections. Alternative plans are also illustrated in Figures 2-1 through 2-4.

Plan A

Plan A provides a rectangular expansion area extending south about 600 feet parallel to Gallo Road. The expansion would increase water area by 7.8 acres, while taking up a total area of 9.4 acres when riprap slope area is included.

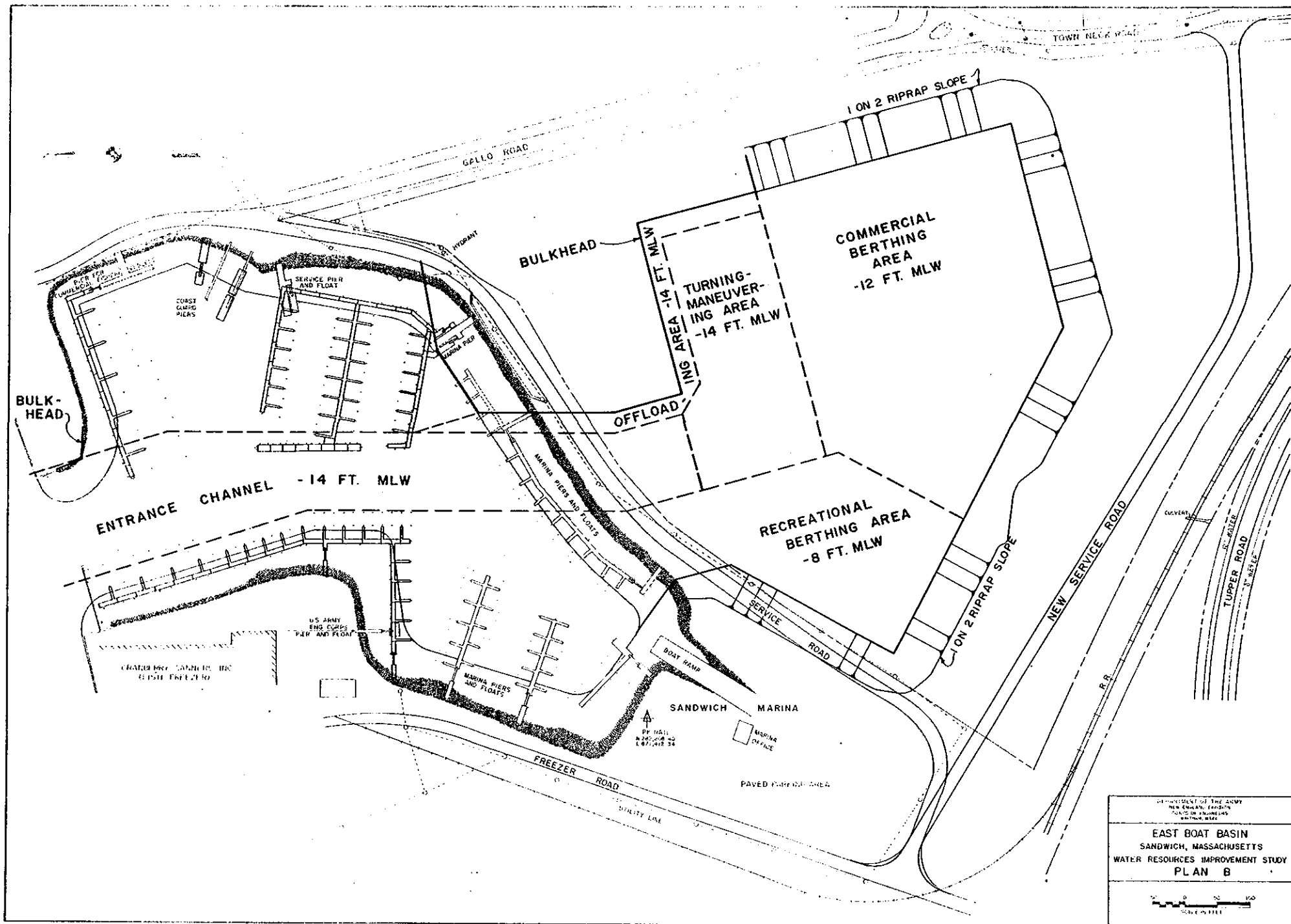


FIGURE 2-2

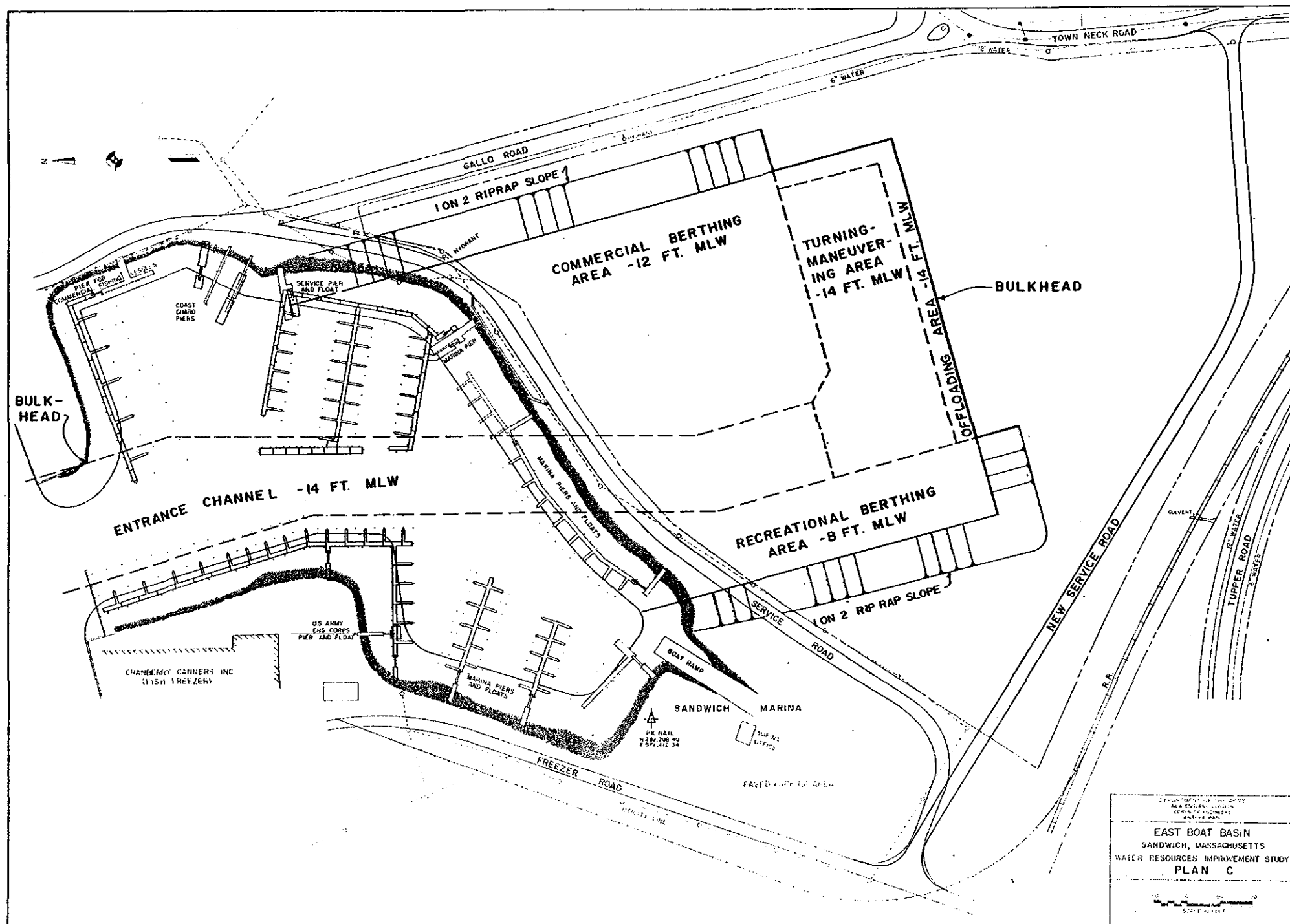


FIGURE 2-3

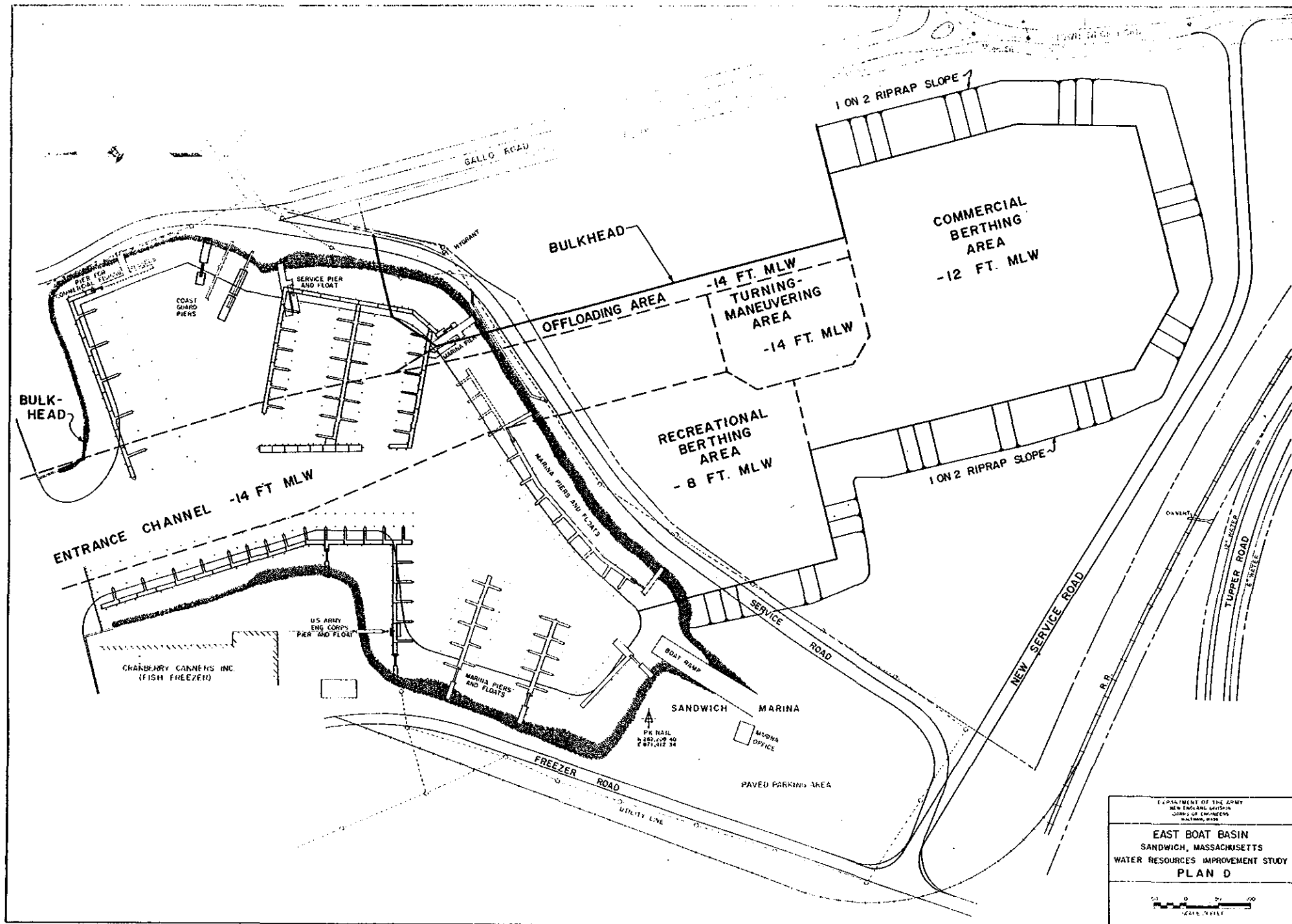


FIGURE 2-4

The 120-foot wide entrance channel skews right into the expansion separating the commercial and recreational berthing areas. The channel would terminate at a 160 foot by 440 foot turning/maneuvering area at the rear of the basin. Adjacent to this area along the shoreline would be fish offloading areas. The expansion would provide increases of 1.4 acres and 3.3 acres in recreational berthing and commercial berthing areas, respectively.

Plan B

Plan B provides a different basin expansion configuration than the previous plan. The major difference is in the location of fish offloading areas, which would be located near the center of the expanded basin along the east side. A sizeable peninsula for location of offloading facilities would extend about halfway into the basin. The entrance channel, following the same alignment as the previous plan and abutting the offloading peninsula, would terminate at a 160 foot by 420 foot turning/maneuvering area located in behind the peninsula. This area would provide access to the commercial and recreational berthing areas located further inside the basin.

The total increase in water area would be 9.7 acres, resulting in a total expansion of 12.4 acres including area requirements for riprap slope. Plan B would provide expanded recreational berthing of 2.3 acres and commercial berthing of 4.3 acres.

Plan C

Plan C is the same as Plan A except that the expansion area extends about 150 feet farther back than Plan A. The increase in water area would be 9.9 acres, with total area of 12.0 acres taken up, including riprap slope.

The entrance channel alignment and turning/maneuvering area are identical to those in Plan A. However, recreational berthing and commercial berthing areas will be greater with areas of 1.8 acres and 4.5 acres, respectively.

Plan D

This plan is similar to Plan B with respect to the location of off-loading facilities. However, the offloading area extends along the side of the basin, rather than extending into the basin. The increase in water area would be 9.8 acres, with a total expansion of 12.7 acres including riprap slope area. Areas of 2.8 acres and 4.6 acres would be provided for recreational berthing and commercial berthing, respectively, in the expansion area.

The entrance channel alignment would be different, swinging left and then abutting the offloading area. The channel would terminate at a 160

foot by 230 foot turning/maneuvering area. This area would provide access to the commercial berthing area farther into the basin. The recreational berthing area would be located adjacent to and west of the entrance channel.

IMPACT ASSESSMENT

This section describes the potential impacts that would result from construction of an expansion project, including dredging/excavation impacts, impacts on navigation, socioeconomic impacts, environmental impacts and economic impacts.

Dredging/Excavation Impacts

Each of the plans would require the removal of material from the existing basin and expansion area. Existing basin material would be minimal, consisting primarily of entrance channel material. In addition to the entrance channel, Plans A and C would also require some dredging of material from the eastern portion of the existing basin. This area would remain at present depths for Plans B and D. The dredging/excavation of the expansion area will require a maximum cut of about 36 feet from channel depth to existing grade. The dredging/excavation impacts are summarized in Table 2-1 below.

Table 2-1

Dredging/Excavation Quantities

<u>Plan</u>	Dredging/Excavation* (C.Y)		
	<u>Existing Basin</u>	<u>Expansion</u>	<u>Total</u>
A	29,550	402,120	431,670
B	19,910	578,060	597,970
C	29,550	504,920	534,470
D	13,820	544,740	558,560

The greatest percentage of project material (93% - 98%) would consist of the landcut material, which is mostly sand and gravel with a lesser percentage of fine-grained material. The quality of the material, by virtue of it being from an upland source, is well above that of sediments dredged from typical harbors in the region.

Navigation Impacts

The navigation system proposed for all plans would provide adequately dimensioned features that would allow safe and efficient navigation for all expected vessels. The entrance channel would provide sufficient width to accommodate two-way traffic for fishing vessels up to 80-90 feet in length. The width would also satisfy the increase in volume of

recreational boating traffic, including existing boats, new boats, rack storage boats, transient boats and trailered boats. The entrance channel depth would allow vessels to enter the basin at all times, thereby precluding tidal delays and preventing the navigation hazards of waiting in the Cape Cod Canal. In addition, the apparent spaciousness of the entrance channel and turning/manuevering area would allow emergency mooring of many vessels during periods of rough weather, thereby serving as a much better harbor of refuge than at present.

The expansion area would provide additional berthing space for both recreational boats and commercial fishing vessels. Slips should be proposed for the recreational berthing area, since open mooring would not provide growth of the recreational fleet. The commercial berthing area would realize benefits with implementation of either slip berthing or open mooring; however, benefits would be less under the open mooring condition. Expected increases in the wet storage fleet for each plan are summarized in Table 2-2 below.

Table 2-2

Projected Fleet Increases

<u>Plan</u>	Recreational	Commercial Vessels	
	<u>Boats</u>	<u>Slip Berthing</u>	<u>Open Mooring</u>
A	1	40	17
B	32	50	21
C	15	52	22
D	53	44	15

The implementation of any expansion plan would disrupt the without-project condition berthing configuration, resulting in the displacement of some recreational boats. However, there would be no loss of berthing space for existing boats, which would be relocated to another portion of the expanded basin. These impacts have been taken into account in Table 2-2, which indicates the net projected fleet increases.

As indicated on Table 2-2, the alternative plans would not be able to substantially meet the projected maximum future condition because of planning limitations. However, a large portion of the projected increase would be small boats 25 feet or under. As part of the formulation process it was assumed that a 120 boat dry storage facility would be provided by the town of Sandwich to address the demand for small boat storage. Consequently, the projected increases in the wet storage fleet would be

comprised of boats over 25 feet. The total projected recreational fleets for each plan, including rack storage are summarized in Table 2-3.

Table 2-3

<u>Total Recreational Fleet</u>				
<u>Plan</u>	<u>Existing Boats</u>	<u>Growth Boats</u>		<u>Total Fleet</u>
		<u>Rack Storage</u>	<u>Wet Storage</u>	
A	142	120	1	263
B	142	120	32	294
C	142	120	15	277
D	142	120	53	315

With the incorporation of rack storage the projected maximum future condition can be substantially met for recreational boating, ranging from 80-95 percent.

Since development of the commercial fishing industry in Sandwich is a major objective of the town, the degree to which the projected maximum future condition could be met, would be somewhat greater. The open mooring scheme would range from 63 to 70 percent, and the slip berthing scheme from 89 to 102 percent of the projected maximum future condition.

Socioeconomic Impacts

Implementation of any of the four detailed plans would result in similar socioeconomic impacts. These impacts would occur in the short-term (during construction), or in the long-term (after construction).

Short-term impacts resulting from construction would affect the normal basin activities and also impact the disposal route. Construction during the summer season would be the most disruptive time of year to perform construction, because of the increased recreational activity. To minimize this interference, construction could be restricted to less active times of the year. Overall, construction of the project is expected to take about 2 years; however, the bulk of the material removal operation would most likely be performed in less than half a year.

Initially, dredging would be performed in the existing basin to construct the entrance channel and deepen other basin areas. A large portion of the dock system and boats would have to be moved out of the way to permit dredging. Many boats would have to temporarily move to other ports or locations, as the construction of the expansion begins. Also, sufficient space must remain available in the existing basin to provide operating room for the dredge and accompanying scows and tug.

The construction equipment would generate noise and air pollution, including odors and dust. Construction of the expansion will impact the

present fuel dock, service road, and the parking lot to be built for the without-project condition. A temporary fueling station would have to be set up somewhere else in the existing basin. Loss of the service road would require a rerouting of traffic between the east and west sides of the basin. Temporary parking arrangements or restrictions could be imposed to mitigate parking problems. Many of these navigation-related activities would be expected to be operating at lower levels since much of the basin would not be accessible during construction.

Impacts due to the material disposal activity would also occur. Scow movement in the basin, Cape Cod Canal and Cape Cod Bay, would be disruptive to normal boat traffic in these areas, and would also be unattractive to observe. Based on 3,000 cubic yard capacity scows, between 100 and 200 trips could be expected to move through the area, depending upon the plan implemented.

Other short-term impacts might include unpleasing aesthetics and increased traffic in the project area. The landings along the bulkhead could also see a temporary decline as fishing vessels shy away from Sandwich during construction, and recreational boating activities would be temporarily curtailed. Other recreation visitation to the basin would probably lessen due to the construction. In summary, over a two-year period, residents and users of the area, and visitors would have to put up with the inconveniences normally associated with construction. The construction would curtail in some way all of the normal activities that take place at the basin.

The most significant long-term socioeconomic impact would be the alleviation of congested basin conditions, and the satisfaction of the demands and potential opportunities of the basin. The improved and enlarged navigation system will enable vessels to transit the harbor in a safer and more orderly manner. The larger berthing areas will permit increases in the commercial fishing and recreational boating fleets, thereby capitalizing on the potential offered by the basin and its location.

Some movement of berthing location by users of the basin would be expected due to the delineation of specific harbor areas. However, the more orderly configuration should satisfy vessel operator needs. The separation of activities will also reduce potential conflict between different basin users.

A major socioeconomic impact that would result from the basin expansion would be a probable surge of surrounding development encouraged by the town of Sandwich. The land slated for development is zoned for commercial and business uses, and therefore a number of enterprises would most likely be constructed around the basin expansion. Assuming a gradual development process over a 10-year period, local residents and basin users would be subjected to various degrees of construction related impacts during this period.

One of the enterprises anticipated to be implemented would be dry rack storage of small recreational boats. The implementation of dry storage is highly probable since the town has expressed an interest in it, and it would greatly facilitate the storage of the projected increase in the recreational fleet. The impact associated with dry storage would be the requirement for small boat owners to use dry storage rather than wet storage. Some people may not be happy with giving larger boats priority for wet storage. However, this type of approach is logically more efficient.

The development of other ancillary facilities and enterprises would increase the level of activity in the general area. More visitors, basin users and business operators would be travelling to the area. Truck traffic would increase due to increased deliveries and pickups. The basin expansion, in conjunction with surrounding development, should present new recreation opportunities for visitors. Visitors will be afforded the opportunity to observe a modern, efficient commercial fishing/recreational harbor in operation.

The expanded basin would eliminate some of the problems faced by local fishermen. Offloading areas within the basin would eliminate hazards experienced by smaller vessels unloading at existing facilities. It is anticipated that the new facilities would reduce the waiting period of smaller fishing boats, since more opportunities for offloading would be available. The harvesting of non-traditional species within the basin

would be expected to complement rather than compete with existing operations.

Although much of the aforementioned development would not be necessary with implementation of the expansion project, offloading facilities to handle the increased fish catch and minimal public services would be required. The onus would be on the town of Sandwich in pursuing its development goals. A comprehensive planning effort, therefore, should be undertaken by the town for development of a plan managing the development of support and other facilities. The expansion along with subsequent development would provide numerous local benefits including increased berthing fees, property tax on new pleasure boats, property tax from new buildings, and fees from leased industrial land. The local economy would also benefit from the new activity with the creation of additional jobs and increased activity for existing businesses.

The town must assume an extremely active role in assuring that the potential of the improvement project is realized. Of local responsibility is the placement of slips, rather than open mooring, as the recommended berthing method, the town would also be required to fund the dredging of the slip areas. The Corps plan provides for the most economically efficient use of the berthing areas.

Environmental Impacts

Environmental impacts would be similar for all plans, varying to some degree based on the quantity of project material and extent of expansion. Impacts would be both short-term and long-term.

During construction operations, there would be a temporary increase in air, noise, and water pollution. Fish and benthic habitat would be disrupted. At the ocean disposal site, impacts would include turbidity and possible release of small amounts of contaminants. Terrestrial habitat at the construction site, and adjacent to it, would be removed or disrupted.

Long-term impacts would provide some potential benefits, including capping of contaminated material from other dredging projects at the disposal site, and the increase of fish and benthic habitat within the basin. Terrestrial habitat would be eliminated by a project. With increased activity in the basin, somewhat more degradation of basin water quality may take place.

The Environmental Assessment, following the main body, provides a detailed account of potential environmental impacts for the selected plan.

Economic Impacts

Three main economic impacts would result from implementation of the proposed project; project costs, project benefits and project cost-sharing. These impacts are discussed in the following sections.

The array of detailed plans propose the use of slip berthing in both the commercial and recreational berthing areas, since this type of system is the most economically feasible. However, the project would also be economically feasible, to a much lesser degree, if open mooring, i.e., four-point with lines and anchors, was proposed for the commercial berthing area. The recreational berthing would still require slips to be economically feasible. The implementation or non-implementation of slips in the commercial area would impact the overall project cost, the project benefits and the apportionment of project costs. The effects of these impacts have been summarized herein to give decision-makers information regarding all potential alternative actions.

Project Costs

The total project first cost of the navigation project would include only the cost for construction of the basin expansion, meaning cost of material removal, slope protection (riprap revetment or bulkhead) and other related costs (road relocation, utility relocation, basin entrance modifications, site work, etc.). The cost of constructing slips would not

be directly attributable to the navigation project. However, slip costs were estimated for inclusion into the economic justification analysis. Tables 2-4 through 2-7 summarize project first cost for Plans A, B, C and D, for the navigation project. Table 2-8 provides the estimated first cost of recreational and commercial slips.

Table 2-4

Project Cost Estimates - Plan A

First Cost (in 000's)

Material removal	\$2,331
Riprap revetment	108
Bulkhead	2,262
Other costs	<u>372</u>
Subtotal	\$5,073
Contingencies (20%)	<u>1,015</u>
Subtotal	\$6,088
Engineering and design (7%)	426
Supervision and administration (7%)	<u>426</u>
Total First Cost	\$6,940

Table 2-5

Project Cost Estimates - Plan BFirst Cost (in 000's)

Material removal	\$3,229
Riprap revetment	175
Bulkhead	3,190
Other costs	<u>375</u>
Subtotal	\$6,969
Contingencies (20%)	<u>1,394</u>
Subtotal	\$8,363
Engineering and design (7%)	585
Supervision and administration (7%)	<u>585</u>
Total First Cost	\$9,533

Table 2-6

Project Cost Estimates - Plan CFirst Cost (in 000's)

Material removal	\$2,886
Riprap revetment	140
Bulkhead	2,262
Other costs	<u>375</u>
Subtotal	\$5,663
Contingencies (20%)	<u>1,133</u>
Subtotal	\$6,796
Engineering and design (7%)	476
Supervision and administration (7%)	<u>476</u>
Total First Cost	\$7,748

Table 2-7

Project Cost Estimates - Plan DFirst Cost (in 000's)

Material removal	\$3,016
Riprap revetment	201
Bulkhead	3,045
Other costs	<u>377</u>
Subtotal	\$6,639
Contingencies (20%)	<u>1,328</u>
Subtotal	\$7,967
Engineering and design (7%)	558
Supervision and administration (7%)	<u>558</u>
Total First Cost	\$9,083

Table 2-8

Slip Costs (in 000's)

<u>Item</u>	Plan			
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
Recreational berthing	\$334	\$587	\$448	\$734
20% Contingency	67	117	90	147
Subtotal	\$400	\$704	\$538	\$881
7% E&D	28	49	38	62
7% S&A	28	49	38	62
Subtotal	\$456	\$802	\$614	\$1,005
Commercial berthing	\$424	\$530	\$551	\$530
20% Contingency	85	106	110	106
Subtotal	\$509	\$636	\$661	\$636
7% E&D	36	45	46	45
7% S&A	36	45	46	45
Subtotal	\$581	\$726	\$753	\$726
Total	\$1,037	\$1,528	\$1,367	\$1,731

Annual Benefits

Benefits expected to accrue if a project is implemented include commercial fishing benefits, recreational boating benefits and charter boat fishing benefits. Commercial fishing benefits are based on the value of increased fish landings attributable to new fishing vessels. The slip condition would realize greater benefit since more new vessels would be accommodated. Recreational boating benefits and charter fishing benefits are based on the value of increased recreation time to new recreational boaters and charter boat fishermen. The project benefits for each alternative plan are enumerated in Table 2-9 below, for both wet storage conditions.

Table 2-9

Summary of Benefits (in 000's)

<u>Plan</u>	<u>Condition*</u>	Commercial	Recreational	Charter	<u>Total</u>
		<u>Fishing</u>	<u>Boating</u>	<u>Fishing</u>	
A	OM	\$1,387.0	\$3.9	\$58.1	\$1,449
	SB	\$2,789.7	\$3.9	\$154.8	\$2,948
B	OM	\$1,944.3	\$110.0	\$77.4	\$2,132
	SB	\$3,486.2	\$110.0	\$193.5	\$3,790
C	OM	\$1,944.3	\$62.2	\$77.4	\$2,084
	SB	\$3,719.5	\$62.2	\$193.5	\$3,975
D	OM	\$1,154.8	\$163.8	\$58.1	\$1,377
	SB	\$3,022.3	\$163.8	\$174.2	\$3,360

*OM - Open mooring, SB - Slip berthing, in the commercial area.

Economic Justification

Determination of economic justification was performed by comparing the annual project benefits to the annual project costs to obtain the benefit-cost ratio (BCR). A BCR of 1 or greater indicates that the benefits of the project outweigh the costs of the project, resulting in an economically feasible project.

The annual economic cost was determined by amortizing the total investment cost for the project over a 50-year project life at a discount rate of .0829, which corresponds to an annual interest rate of 8.125 percent. The total investment cost includes the cost of construction, the cost of slips, the economic value of land taken by the project and the interest during construction (IDC). An annual maintenance charge was then added to the annual economic cost, giving the total annual cost. The total annual costs were then compared with the annual benefits to obtain the BCRs and annual net benefits. Annual net benefits provides a measure of the benefit that would be generated by the project after cost has been incurred. Table 2-10 summarizes annual benefits, annual costs, BCRs and annual net benefits.

Table 2-10

Economic Justification (000's)

<u>PZS:Q</u>	<u>Annual</u>	<u>Annual</u>	<u>BCR</u>	<u>Net</u>
	<u>Benefits</u>	<u>Costs</u>		<u>Benefits</u>
A OM	\$1,449	\$718	2.0	\$731
SB	\$2,948	\$770	3.8	\$2,178
B OM	\$2,132	\$994	2.2	\$1,138
SB	\$3,790	\$1,059	3.6	\$2,731
C OM	\$2,084	\$816	2.6	\$1,268
SB	\$3,975	\$884	4.5	\$3,091
D OM	\$1,377	\$972	1.4	\$405
SB	\$3,360	\$1,037	3.2	\$2,323

Cost Apportionment

Three cost apportionment scenarios were considered and/or analyzed, traditional cost-sharing, cost-sharing based on precedent and cost-sharing as proposed by the administration. Cost-sharing policies proposed by the administration are addressed in the Cost Apportionment section of the main body. The remaining cost-sharing scenarios are summarized herein.

The cost-sharing summaries include only the first cost of construction and do not take the cost of placing slips into account, since they are not considered as part of the navigation system that is under study. Cost estimates for slips were developed, however, for economic evaluation purposes. In order for local interests to consider the full cost impact on them, the slip costs summarized in Table 2-8 should also be included as a local cost when applicable.

Traditional cost-sharing was determined for two conditions in the commercial area, open mooring and slip berthing. The decision regarding placement of slips in the commercial area will affect project benefits and cost-sharing. Tables 2-11 and 2-12 summarize the traditional cost sharing for each condition.

Table 2-11

Traditional Cost-Sharing - Open Mooring

<u>Plan</u>	Federal		Non-Federal	
	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>
A	\$2,568,000	37.0	\$4,371,000	63.0
B	\$3,472,000	36.4	\$6,059,000	63.6
C	\$3,238,000	41.8	\$4,508,000	58.2
D	\$3,286,000	36.2	\$5,795,000	63.8

Table 2-12

Traditional Cost-Sharing - Slip Berthing

<u>Plan</u>	<u>Federal</u>		<u>Non-Federal</u>	
	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>
A	\$1,218,000	17.6	\$5,722,000	82.4
B	\$1,078,000	11.3	\$8,458,000	88.7
C	\$1,512,000	19.5	\$6,234,000	80.5
D	\$895,000	9.9	\$8,187,000	91.1

Cost-sharing could also be affected by the precedent established because of the existing authority under which the present marina was implemented. House Document 168, which recommended construction of the 1963 expansion, states that local interests should be required to construct a marina in the expansion. A marina was in fact placed in the 8-foot Federal anchorage constructed in 1963. Therefore, construction of the recreational portion of the proposed expansion project may be cost-sharible by the Federal government on a 50/50 basis, according to traditional recreational cost-sharing policies. Tables 2-13 and 2-14 summarize the affect of this possibility. Impact would be minimal because the cost of constructing the recreational area would be relatively small compared to the total project cost. Comparison with Tables 2-11 and 2-12 indicate the affect this possibility could have on cost-sharing.

Table 2-13

Precedent Based Apportionment - Open Mooring

<u>Plan</u>	<u>Federal</u>		<u>Non-Federal</u>	
	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>
A	\$2,842,000	41.0	\$4,097,000	59.0
B	\$3,958,000	41.5	\$5,573,000	58.5
C	\$3,569,000	46.1	\$4,177,000	53.9
D	\$3,711,000	40.9	\$5,370,000	59.1

Table 2-14

Precedent Based Apportionment - Slip Berthing

<u>PZSr</u>	<u>Federal</u>		<u>Non-Federal</u>	
	<u>Cost</u>	<u>Percent</u>	<u>Cost</u>	<u>Percent</u>
A	\$1,492,000	21.5	\$5,448,000	78.5
B	\$1,564,000	16.4	\$7,977,000	83.6
C	\$1,843,000	23.8	\$5,903,000	76.2
D	\$1,320,000	14.5	\$7,762,000	85.5

COMPARISON OF DETAILED PLANS

All plans generally address the problems and needs in the same manner, through construction of a basin expansion. Depths of navigation features and channel dimensions are consistent for all plans. The physical differences would be in the configuration of the expansion area, including the location and size of project features. Project economics and the degree to which planning objectives are met, are affected by these variables.

The four plans can be roughly grouped into two categories based on where offloading of fish would take place; at the back of the basin (Plans A and C), or along the east side of the basin (Plans B and D). Plans A and C are virtually the same, except that Plan C is somewhat larger. The variation in location of offloading areas affects the location of the other project features. In Plans A and C vessels would have to travel to the back of the basin to offload, whereas Plans B and D would provide offloading nearer the front of the basin. This factor could have some impact on traffic patterns within the basin.

There is also a trade-off between the two groups of plans in that Plans B and D provide somewhat larger recreational berthing areas, thereby addressing the recreational boating objective to a greater extent. In comparing the three larger plans (Plans B, C and D), which are comparable in size, the increase in the commercial fleet would be similar except for Plan D. Plan D has an entrance channel alignment that displaces a portion of the existing fleet, which would most likely obtain space in the

expansion area, thereby reducing its capacity for new vessels. Plan A, the smallest plan, trades off less cost for smaller fleet increases.

Plans A and C also physically separate the commercial fishing and recreational boating activities with a central entrance channel, whereas in Plans B and D the two areas abut. It may be desirable to keep these activities separate.

Comparison of environmental impacts can be performed based on the size of plans. As the size of each plan increases, so do the impacts. The two factors to consider are the amount of material that would be removed, and the extent of expansion inland. Material disposal would have impacts at the disposal site, and the amount of construction would affect the immediate environment. For amount of material to be disposed, plans would be ranked A, C, D, B from least to greatest, and for amount of expansion, plans would be ranked A, C, B, D from least to greatest.

Comparison of economic impacts examined the relative costs, benefits and cost apportionment for detailed plans. The larger the plan the greater the cost, with plans ranked A, C, D, B from least to greatest. The east side offloading plans would have a greater cost impact because of additional bulkhead, a high cost item, which is required for this type of configuration. However, there is a potential tradeoff in that more access to the basin would be provided for other than offloading facilities. Final planning for the project could pare down or increase the amount of bulkhead desired by local interests, for any of the plans. In addition to the cost of each navigation plan, additional cost would be incurred by

local interests for slips in the recreational area and most likely the commercial area.

Plan C would provide the greatest benefit since it projects the greatest increase in commercial fishing benefits, which accrue at a greater rate than the value placed on recreational boating. This factor affects the economic feasibility of plans, by decreasing total benefits for plans that address the recreational objective to a greater degree. Slips would be placed in the recreational berthing area to insure growth in the recreational fleet; however, sufficient benefits would be generated by open moored fishing boats so that slips would not be required in the commercial area. With open-mooring of fishing vessels, the projected fleet increase would be smaller, and therefore the benefits would be less attractive. Slips in the commercial area would be recommended to maximize benefits.

The apportionment of project cost addressed construction of the navigation project only and not the cost of slips, which are a local expense. However, apportionment of costs would be affected by the decision to implement or not to implement slips in the commercial area. Cost-sharing policies are such that Federal participation in project features that are proposed to use slip berthing is not allowed. Therefore, local cost-sharing would suffer when maximizing benefits through the use of slips. The local cost-share would range from about 58.2 to 63.8 percent for open-mooring, and from about 80.5 to 91.1 percent for slip berthing. Plans A and C would provide the greater Federal cost-share because the entrance channel and turning/manuevering area are larger for those plans, and Federal cost-sharing for those features is greater.

The affect of alternative plans on the existing basin would be similar for all plans. The entrance channel would eliminate berthing space because of its space requirements and would cause some reorganization of slips. The expansion would also displace recreational boats that presently berth along the back of the basin. The only real difference between alternatives regarding the existing basin, is that Plan D has a different channel alignment that would eliminate more berthing space than plans A, B or C.

Another factor of comparison to be considered by local interests would be the compatibility of basin configuration with onland development. The alternatives offer several general possibilities that could probably be modified somewhat, if necessary. The varying locations of project features would affect the location and density of onland development, and the future traffic patterns in the area. Each of the alternatives, along with associated onland development, would also vary in aesthetics. In comparing plans, local interests should conceptualize and visualize what they feel each alternative would look like in a fully developed state in order to determine which plan is most compatible with local desires.

The System of Accounts provides a summary comparative evaluation of the four detailed plans. The System of Accounts provides a concise format that compares the expected impacts of detailed plans in terms of the National Economic Development (NED) objective, and the national accounts of Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE). It also demonstrates plan performance in terms of

planning objectives, planning constraints and other measures of acceptability. Table 2-15 provides the System of Accounts, for the slip condition in the commercial berthing area only, since the maximum net benefits are generated under the slip condition. Alternative plan impacts would be virtually the same for the open-mooring condition, except that benefits would be less, and cost-sharing would be more advantageous to local interests. These differences can be compared in tables of the previous section.

In addition to the System of Accounts, Table 2-16 provides a summary of significant EQ effects for various resource areas. It provides an additional source of information for determining the net EQ effects of the proposed project.

TABLE 2-15

SYSTEM OF ACCOUNTS

<u>Account</u>	¹ <u>Without-Project Condition</u>	² <u>Plan A</u>	³ <u>Plan B</u>	⁴ <u>Plan C</u>	⁵ <u>Plan D</u>
I. <u>PLAN DESCRIPTION</u>					
A. Federal Structures					
1. Entrance Channel	None Delineated	120' wide x 14' deep x 1060' long	120' wide x 14' deep x 1030' long	120' wide x 14' deep x 1220' long	120' wide x 14' deep x 1080' long
2. Turning/Manuever- ing Area	None Delineated	450' x 160' (1.8 acres)	390' x 160' (1.7 acres)	450' x 160' (1.8 acres)	230' x 160' (.8 acres)
B. Local Structures					
1. Commercial Berth- ing Area	40 Slips	3.3 acre increase 80 total slips	4.3 acre increase 90 total slips	4.5 acre increase 92 total slips	4.6 acre increase 84 total slips
2. Recreational Berthing Area	132 slips	1.4 acre increase 133 total slips	2.3 acre increase 164 total slips	1.8 acre increase 147 total slips	2.8 acre increase 185 total slips
3. Bulkhead offload- ing Area	None	660' x 30'	800' x 30'	660' x 30'	670' x 30'
4. Bulkhead	None	780 lineal feet	1100 lineal feet	780 lineal feet	1050 lineal feet
C. Federal Land Require- ments	None	2.5 acres	1.2 acres	2.5 acres	1.9 acres
D. Local Land Require- ments	None	6.9 acres	11.2 acres	9.5 acres	10.8 acres
II. <u>NATIONAL ECONOMIC DEVEL- OPMENT</u>					
A. Implementation Cost					
1. Navigation Project					
a. Federal cost	N/A	\$1,218,000	\$ 1,073,000	\$ 1,512,000	\$ 895,000
b. Local cost	N/A	5,722,000	8,458,000	6,234,000	8,187,000
c. Total cost	N/A	6,940,000	9,531,000	7,746,000	9,082,000
2. Economic costs					
a. Slips	N/A	1,037,000	1,528,000	1,367,000	1,731,000
b. Value of land	N/A	423,000	558,000	540,000	572,000
c. Interest during construction	N/A	689,000	952,000	792,000	934,000

TABLE 2-15
SYSTEM OF ACCOUNTS
(Continued)

<u>Account</u>	<u>1</u> <u>Without-Project</u> <u>Condition</u>	<u>2</u> <u>Plan A</u>	<u>3</u> <u>Plan B</u>	<u>4</u> <u>Plan C</u>	<u>5</u> <u>Plan D</u>
d. Total cost	N/A	\$2,149,000	\$ 3,038,000	\$ 2,699,000	\$ 3,237,000
3. Total investment cost	N/A	9,089,000	12,569,000	10,445,000	12,319,000
B. Annual Charges					
1. Interest and amortization	N/A	753,000	1,042,000	866,000	1,021,000
2. Maintenance charge	N/A	17,000	17,000	18,000	16,000
3. Total annual charge	N/A	770,000	1,059,000	884,000	1,037,000
C. Annual Benefits					
1. Increased fish landings	N/A	2,790,000	3,486,000	3,720,000	3,022,000
2. Charter boat fishing	N/A	155,000	194,000	194,000	174,000
3. Recreational boating	N/A	4,000	110,000	62,000	164,000
4. Total annual benefits	N/A	2,949,000	3,790,000	3,976,000	3,360,000
D. Benefit-Cost Ratio	N/A	3.8 to 1	3.6 to 1	4.5 to 1	3.2 to 1
E. Net Annual Benefits	N/A	2,179,000	2,731,000	3,092,000	2,323,000

III. ENVIRONMENTAL QUALITY

A. Material Removal (c.y.)

1. Dredged material	0	29,550	19,910	29,550	13,820
2. Landcut material	0	402,120	578,060	504,920	544,740
3. Total material	0	431,670	597,970	534,470	558,560

B. Water Quality

1. Short-term impacts in harbor	None	Turbidity	Same as 2	Same as 2	Same as 2
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TABLE 2-15

SYSTEM OF ACCOUNTS
(Continued)

Account	1 Without-Project Condition	2 Plan A	3 Plan B	4 Plan C	5 Plan D
2. Long-term impacts in harbor	None	Minor degradation	Same as 2	Same as 2	Same as 2
3. Short-term impacts at disposal site	None	Turbidity	Same as 2	Same as 2	Same as 2
4. Long-term impacts at disposal site	None	May improve habitat	Same as 2	Same as 2	Same as 2
C. Air Quality					
1. Short-term impacts	None	Fuel emissions, dust and noise during construction	Same as 2	Same as 2	Same as 2
2. Long-term impacts	None	Minor degradation from increased fuel emissions and noise	Same as 2	Same as 2	Same as 2
D. Plants and Animals					
1. Aquatic vegetation destroyed	No change	Yes, temporary, will increase habitat due to increased harbor area	Same as 2	Same as 2	Same as 2
2. Benthic fauna destroyed	No change	Yes, temporary, will increase habitat due to increased harbor area	Same as 2	Same as 2	Same as 2
3. Fishery habitat destroyed	No change	Yes, temporary, will increase habitat due to increased harbor area	Same as 2	Same as 2	Same as 2
4. Terrestrial vegetation destroyed	Possible upland development at site by local interests	Yes, minimal, surrounding area to be developed by local interests	Same as 2	Same as 2	Same as 2
5. Terrestrial wildlife displaced or destroyed	Possible upland development at site by local interests	Yes, minimal, surrounding area to be developed by local interests	Same as 2	Same as 2	Same as 2

TABLE 2-15

SYSTEM OF ACCOUNTS
(Continued)

<u>Account</u>	<u>1</u> <u>Without-Project</u> <u>Condition</u>	<u>2</u> <u>Plan A</u>	<u>3</u> <u>Plan B</u>	<u>4</u> <u>Plan C</u>	<u>5</u> <u>Plan D</u>
E. Visual Appearance					
1. Temporary impact on aesthetics	No change	Yes, construction equipment and turbidity	Same as 2	Same as 2	Same as 2
2. Permanent impact on aesthetics	Possible upland development at site by local interests	Additional docks and upland development	Same as 2	Same as 2	Same as 2
F. Land Use					
1. Wetlands lost	None	Same as 1	Same as 1	Same as 1	Same as 1
2. Nondeveloped area disrupted	Possible upland development at site by local interests	Area adjacent to project to be used for stockpiling and dewatering, if necessary	Same as 2	Same as 2	Same as 2
3. Commercial land use disrupted	No	Yes, parking lot and service road	Same as 2	Same as 2	Same as 2
4. Recreational land use disrupted	No	Yes, parking lot and service road	Same as 2	Same as 2	Same as 2
IV. <u>REGIONAL ECONOMIC DEVELOPMENT</u>					
A. Income	Continued growth	Substantial growth, due to increased activity at the basin	Same as 2	Same as 2	Same as 2
B. Employment	Continued growth	Substantial growth, dependent upon level of upland development	Same as 2	Same as 2	Same as 2
C. Promotes Growth of Regional Business and Industry	Continued growth	Yes, accelerated growth	Same as 2	Same as 2	Same as 2
D. Property Values	Continued growth	Appreciation of land value will accelerate in the area	Same as 2	Same as 2	Same as 2
V. <u>OTHER SOCIAL EFFECTS</u>					
A. Construction Impacts					
1. Disruption of recreational boating	None	Yes	Same as 2	Same as 2	Same as 2

TABLE 2-15
SYSTEM OF ACCOUNTS
(Continued)

<u>Account</u>	<u>1</u> <u>Without-Project</u> <u>Condition</u>	<u>2</u> <u>Plan A</u>	<u>3</u> <u>Plan B</u>	<u>4</u> <u>Plan C</u>	<u>5</u> <u>Plan D</u>
2. Disruption of commercial fishing	None	Yes	Same as 2	Same as 2	Same as 2
3. Health and safety hazards	None	Construction equipment increases health and safety risks	Same as 2	Same as 2	Same as 2
4. Vehicular traffic	None	Traffic on other roads may increase	Same as 2	Same as 2	Same as 2
5. Disruption of other recreation	None	Yes	Same as 2	Same as 2	Same as 2
6. Disruption of business	None	Yes	Same as 2	Same as 2	Same as 2
B. Post-Construction Impacts					
1. Archeological and historical value lost	None	Same as 1	Same as 1	Same as 1	Same as 1
2. Safety of navigation	None	Increased safety	Same as 2	Same as 2	Same as 2
3. Increased vehicular traffic	None	Yes	Same as 2	Same as 2	Same as 2
4. Displacement of people/resources	None	Same as 1	Same as 1	Same as 1	Same as 1
5. Community cohesion	No change	Same as 1	Same as 1	Same as 1	Same as 1
6. Community growth	Continued growth	Growth accelerated	Same as 2	Same as 2	Same as 2
7. Recreation opportunities	No change	Increased opportunity	Same as 2	Same as 2	Same as 2
VI. <u>ACHIEVES PLANNING OBJECTIVES</u>					
A. Planning Objectives					
1. Growth of commercial fishing fleet*	None	100% increase	125% increase	130% increase	110% increase

TABLE 2-15

SYSTEM OF ACCOUNTS
(Continued)

<u>Account</u>	<u>1</u> <u>Without-Project</u> <u>Condition</u>	<u>2</u> <u>Plan A</u>	<u>3</u> <u>Plan B</u>	<u>4</u> <u>Plan C</u>	<u>5</u> <u>Plan D</u>
2. Growth of recreational boating fleet	None	1% increase - wet storage 85% increase - with rack storage	23% increase - wet storage 107% increase - with rack storage	11% increase - wet storage 95% increase - with rack storage	37% increase - wet storage 122% increase - with rack storage
3. Safety of navigation	Congested	Safety enhanced	Same as 2	Same as 2	Same as 2
4. Socioeconomic development growth	Minimal growth	Substantial accelerated growth	Same as 2	Same as 2	Same as 2
5. Minimization of adverse impacts on environmental Resources.	Maintains existing resources	Development takes place at existing harbor area. Project material will cap contaminated material disposed of at the Foul Area for previous projects.	Same as 2	Same as 2	Same as 2

*Includes charter fishing boats

Table 2-16

Significant EQ Effects - Plans A, B, C and D

<u>Significant Resource</u>	<u>Effects on EQ Attributes</u>			<u>Notes</u>
	<u>Ecological</u>	<u>Cultural</u>	<u>Aesthetic</u>	
East Boat Basin	<u>Beneficial</u> Increased fish and benthic habitat.	No effect	<u>Beneficial</u> People enjoy obser- ving marine related activities.	The basin expansion would provide a larger harbor resource area.
	<u>Adverse</u> Temporary disruption of fish and benthic habitat. Permanent disruption of terrestrial wildlife habitat. Minimal de- gradation of water quality.		<u>Adverse</u> Increased development. Increased harbor activity. Disrup- tion of existing activities during construction. Turbid water.	The basin expansion would increase activity in and around the basin.

Cape Cod Canal

Adverse

Minimal turbidity
near the East Boat
Basin entrance.
Minor degradation
of water quality.

No effect

Adverse

Dredge scow
traffic during
construction.

Strong canal
currents would
quickly disperse
turbidity and
small amounts of
pollutants coming
out of the basin.

Massachusetts Bay
(Foul Area)

Beneficial

May provide new
benthic habitat.
May prevent/slow
down release of
contaminants from
previous dredgings.

No effect

Adverse

Dredge scow
traffic during
construction.

The project
material is very
clean, compared
to typical
dredged material.

Adverse

Suspended material may
affect marine life.

SELECTING A PLAN

Plan C was selected as the recommended plan for implementation. The rationale for selection of Plan C is that it would generate the maximum net benefits. This is in keeping with the National Economic Development policies, which promote the increase of the nation's economic output. Plan C is also favorable from the environmental quality point of view, since it would rank second lowest in material to be disposed of. It also ranks second lowest in expansion size, which would reduce impacts on surrounding non-developed areas. The central entrance channel of Plan C would separate the two marine activities, thereby preventing potential problems. Based on this rationale Plan C appears to be the most acceptable plan. The description and discussion concerning the selected plan is contained in the main body of the Feasibility Report in The Selected Plan section.

EAST BOAT BASIN
CAPE COD CANAL
SANDWICH, MASSACHUSETTS

FEASIBILITY REPORT
AND
ENVIRONMENTAL ASSESSMENT

APPENDIX 3
PUBLIC VIEWS AND COMMENTS

Prepared by the
New England Division, Corps of Engineers
Department of the Army

PUBLIC VIEWS AND COMMENTS

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PUBLIC ANNOUNCEMENT



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDPL-C

7 July 1980

ANNOUNCEMENT

INITIATION OF A NAVIGATION STUDY

FOR

EAST BOAT BASIN, SANDWICH, MASSACHUSETTS

The New England Division of the United States Army Corps of Engineers is initiating an investigation of the East Boat Basin, located on the south side of the Cape Cod Canal in Sandwich, Massachusetts, to determine whether any modifications are advisable at this time, particularly for the benefit of the existing and prospective commercial fishing and recreational boating fleets. The investigation is authorized by a resolution adopted 9 May 1978 by the Committee on Public Works and Transportation, U.S. House of Representatives.

The existing Federal project in the East Boat Basin consists of a 2.7 acre harbor of refuge dredged and constructed in the late 1930's to a depth of 13 feet. This portion was dredged under the authority of the existing project for the Cape Cod Canal which authorized the provision of accessory and minor features deemed necessary to provide facilities for the maintenance and repair of floating plant used in connection with the operation of the canal. A 4.3-acre extension to the basin originally dredged to a depth of 8 feet, was authorized by the River and Harbor Act of 1958.

The town of Sandwich and other local interests desire to expand the existing East Boat Basin to relieve the current overcrowded conditions and to accommodate the increasing recreational and commercial fishing fleets. The town purchased 11.1 acres of land adjacent to and south of the existing basin in May 1978 in anticipation of providing an extra 175 boat spaces with access through the East Boat Basin. Additional contiguous land of 11.4 acres already owned by the town will provide a total of 22.5 acres of land for development of concomitant services and goods. A map showing the existing project and a general description of the area of expansion proposed by local proponents is attached as Inclosure 1.

The study will advise the Congress on whether there is a Federal interest in improvements or other modifications to the existing East Boat Basin Project based on applicable Federal laws and policies. A favorable recommendation will require that the navigation improvements be economically justified, i.e.,

the benefits attributed to the project exceed the cost of construction and subsequent maintenance; that the environmental, social, and/or other consequences of the project are generally acceptable to the public; and that a local cooperating agency formally indicates its willingness and capability to provide the non-Federal requirements for the project.

The New England Division will conduct the study in three stages, in accordance with the planning procedures established by the Corps of Engineers' regulations which are responsive to the Water Resources Council's "Principles and Standards for Planning Water and Related Land Resources." These procedures are summarized in Inclosure 2 for your information.

Presently, we are conducting Stage 1 investigations to determine the need for and extent of future work required for the study. These investigations involve analyzing current and probable future conditions in the East Boat Basin area to identify navigation needs and other water and related land resource concerns which should be addressed by the study. Based on available information and preliminary engineering, environmental, and economic studies, we will evaluate those solutions which appear to be the most viable to determine whether improvements for navigation and possibly other water resource needs are sufficiently justified economically to warrant further study. The results of these Stage 1 studies will be summarized and presented in a Reconnaissance Report. If these studies result in favorable findings, we will develop a Study Program to outline the effort and schedule of work to be performed in Stages 2 and 3 of the Study.

I wish to emphasize that the Corps of Engineers considers active public participation in our studies critical to the success of developing acceptable projects that are responsive to the current and future water and related land resource needs of the nation. In this regard, we are developing a program for public participation in the East Boat Basin Study to provide for the interchange of information between the interested public and the Corps of Engineers. This program will allow public input to influence the development and evaluation of plans in reaching a study decision. In soliciting public input to Stage 1 of the study, we intend to conduct a public meeting; coordinate with appropriate Federal, State, and local government agencies; meet with various boating, commercial fishing, and environmental interests; and attempt to contact all other interested parties.

At this time, we are interested in obtaining any available information you may have concerning the navigation problems and needs or other water and related land resource needs in the East Boat Basin area. This information, which will be considered in Stage 1 studies, can include:

1. The number, type, and draft of the commercial fishing and recreational boating fleets.
2. The amount of commercial fishing in recent years.

3. The description of any restrictions in commercial fishing and recreational boating due to inadequate channels and/or land based facilities.

4. The description of expected future expansion of navigation facilities including commercial fishing industry, and marinas.

5. Or other information describing navigation conditions in the area.

We also will welcome your views and opinions on other problems and desired improvements which should be considered in the study. If the information is too voluminous for immediate transmittal, a letter including a list of available data that you could provide would allow us to make arrangements to review and possibly obtain the information. It would be appreciated if information could be furnished within 30 days after receipt of this notice.


Correspondence providing information or raising questions concerning the East Boat Basin Study should be addressed to:

Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02154

Please feel free to contact me by telephone at (617) 894-2400 or in my absence, Mr. James Abcouwer, Project Manager, at (617) 894-2400, Extension 556.

We have attempted to send this notice to all individuals and organizations who may have an interest in this study. If you know of anyone who may desire to be involved, and who has not been contacted by us, please provide them with a copy of your letter or ask them to contact our office.

Sincerely,


MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

- 2 Incls
1. Project Map
2. Summary of Corps of Engineers
Planning Procedure

**U.S. ARMY CORPS OF ENGINEERS
WATER AND RELATED LAND RESOURCES PLANNING**

LEGISLATIVE AND EXECUTIVE POLICIES

The U.S. Army Corps of Engineers Engineering Regulations (ER 1105-2-200 series) established procedures for conducting feasibility studies for planning Federal water and related land resources projects. These procedures are consistent with the requirements of legislative and executive policies including the Water Resources Council's "Principles and Standards for Planning Water and Related Land Resources," the National Environmental Policy Act of 1969 (PL 91-190), Sections 122 and 209 of the River and Harbor Act of 1970 (PL 91-611), the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), as well as others. In addition, the planning of Federal Water Resources projects reflects the requirements of Executive guidelines including pertinent Executive Orders.

PLANNING GOALS

The Water Resources Planning policy instituted by the Principles and Standards (P&S) for Federal and Federally assisted water related land planning identifies two national goals towards which planning should be directed, and a system of four accounts to measure plan effects. The two national goals towards whose enhancement the formulation of alternatives will be directed are National Economic Development (NED) and Environmental Quality (EQ). The national objective of economic development is achieved by increasing the value of the nation's output of goods and services and improving national economic efficiency. The national EQ objective is to enhance the quality of the environment through the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

The system of accounts to be established displays the beneficial and adverse effects of each alternative plan for the NED and EQ national goals, and for the categories of Regional Development (RD) and Social Well-Being (SWB) toward providing a basis for plan comparison and decision-making. Contributions to Regional Development (RD) are determined by evaluating a proposal's effects on a region's real income, employment, population, economic base environment, and social development. Contributions to the Social Well-Being Account (SWB) are determined by evaluating a proposal's effects on real income, security of life, health and safety, education, cultural and recreational opportunities, emergency preparedness, and other factors.

CORPS OF ENGINEERS PLANNING PROCESS

The Corps of Engineers planning procedures establish a planning framework to guide planning for the conservation, development, and management of the water and related land resources. The framework requires the systematic preparation and evaluation of alternative ways of addressing problems, needs, concerns, and opportunities under the Principle and Standards (P&S) objectives of National Economic Development (NED) and Environmental Quality (EQ). This results in information necessary to make effective choices regarding resource management under existing and projected conditions. Alternative plans are formulated without bias to structural or nonstructural measures.

Plans are developed in three stages, initial, intermediate, and final. During the initial stage, planners formulate a conceptual plan of the study to guide subsequent planning. During the intermediate stage, a broad range of plans is developed and analyzed. In the final stage, plans are screened and detailed plans are developed to furnish a basis for selection and recommendation. During each stage, four functional planning tasks are accomplished. They are problem identification, formulation of alternatives, impact assessment, and evaluation. The four planning tasks are emphasized in varying degrees in the different planning stages. Problem identification is the most important task during Stage I studies, whereas the emphasis shifts more toward impact assessment and evaluation in Stage II as more detailed plans are developed. Figure 1 shows the relative emphasis placed on each task during the various study stages. On the figure, the relative amount of emphasis placed on each task is indicated by the size of the block as compared to the size of the other blocks in that stage. A higher level of detail for data and analysis and more precise alternative plans are obtained as the study progresses through each plan development stage. The process of iterating the four planning tasks in each stage provides flexibility to the study to be receptive to changing needs, rising opposition, or support for modified alternatives, new and refined data, and more appropriate or modified alternatives. Further, this approach provides a systematic planning process to allow for review by higher Corps of Engineers echelon and public interests, and to facilitate study management.

STAGE 1 - RECONNAISSANCE.

The general purpose of this stage is to make an initial analysis of water and related land resource management problems and solutions to determine whether additional study is warranted and to develop a study program for subsequent planning. During this initial stage, the four planning tasks are performed at a preliminary level of detail to define the scope and character of the study and delineate planning objectives, including the range of issues related to resource management in the study area and the alternative solutions to these issues. Because of the introductory nature of the planning tasks at this stage, the effort generally involves gathering and analyzing a wide range of available information and public views and desires. The product of this stage is a Reconnaissance Report which documents the Stage 1 findings, justification for further study, and the program for work in Stages 2 and 3, including the study cost schedule.

STAGE 2 - INTERMEDIATE PLANS.

The purpose of Stage 2 is the selection of alternative plans which will be considered for recommendation during Stage 3. In Stage 2, all viable alternatives will be evaluated to determine their feasibility from economic, environmental, engineering and public acceptability viewpoints. Decisions made during Stage 2 must include a determination of the Federal interest in the alternative plans based on Federal laws and policies. Based on a more definitive analysis of the problems and needs in/or related to the study area, alternative management plans will be formulated without concentrating on detailed engineering design and impact quantification. The data will be sufficient to set forth and analyze the feasibility of alternative resource management plans. The potential impact of these alternative plans will be assessed, concentrating on significant contributions to the four accounts of NED, EQ, RD, and SWB as well as public perceptions of these impacts. The results of this effort will be used to decide which management plans warrant detailed considerations in Stage 3.

STAGE 3 - FINAL PLANS.

The objective of the final planning stage is the selection of a plan for recommendation. During Stage 3, emphasis is on modifying, assessing, and evaluating the intermediate alternatives carried into Stage 3 to produce detailed, implementable plans. The product of Stage 3 is the final study document which presents the recommendations of the Division Engineer, including information on the overall study findings, Environmental Impact Statement, and pertinent information from interested publics leading to the recommendations. The design, impact assessment, and evaluation of the final alternative plans will require specific and well-defined data at a comparable level for each plan in such a way that an effective choice can be made by the decision-making publics.

PUBLIC INVOLVEMENT.

The general policies of the Corps of Engineers for public involvement and citizens participation are provided in Engineering Regulation 1105-2-800, "PUBLIC INVOLVEMENT: GENERAL POLICIES." In this regulation, "public" is defined as any affected or interested non-Corps of Engineers entity. This includes other Federal, regional, State, County or local government agencies and officials, public and private organizations, and individuals.

It is the policy of the U.S. Army Corps of Engineers that water resources studies be conducted in an atmosphere of public understanding, trust, and mutual cooperation. The objective of public involvement and citizens participation is the active involvement of the public in water resources studies to assure that they respond to public needs and preferences to the maximum extent possible, within the bounds of local, State and other Federal programs, responsibilities and authorities.

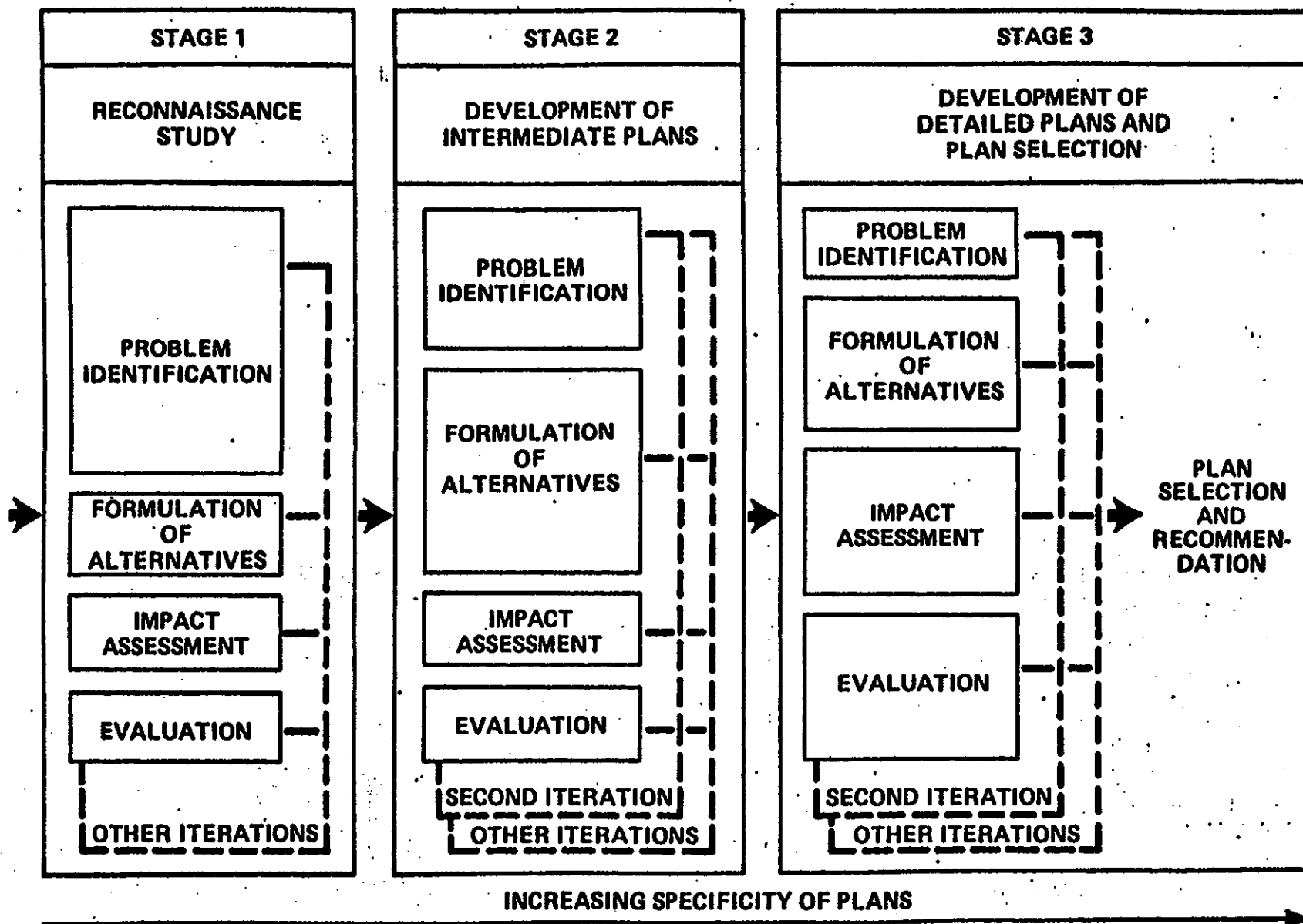
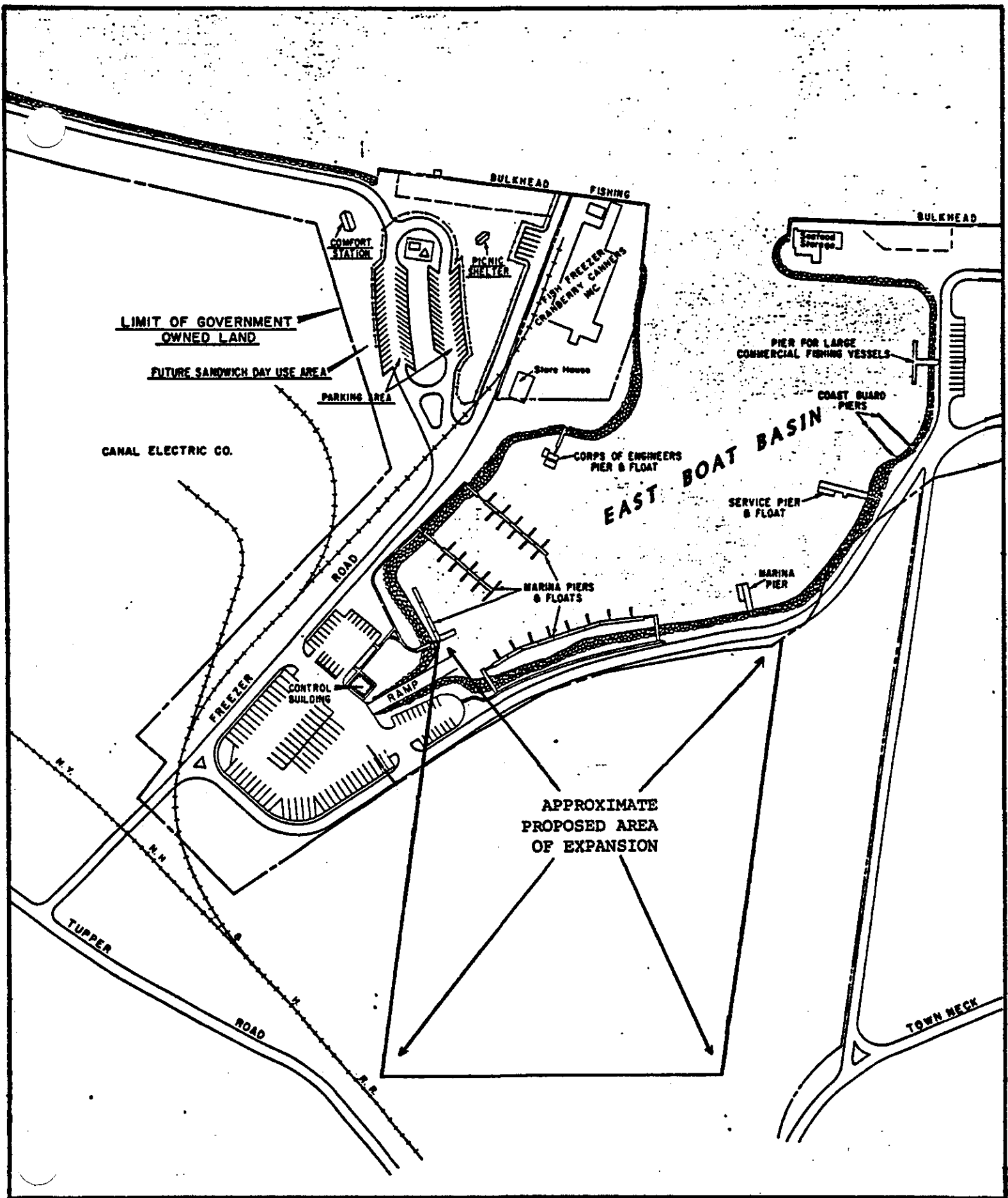


FIGURE 1: GENERAL RELATIONSHIP OF PLAN DEVELOPMENT STAGES AND FUNCTIONAL PLANNING TASKS



STUDY CORRESPONDENCE



THE COMMONWEALTH OF MASSACHUSETTS

METROPOLITAN DISTRICT COMMISSION
20 SOMERSET STREET, BOSTON 02108

PUBLIC INFORMATION OFFICE
727-5215

July 14, 1980

Max B. Scheider, Colonel
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Mass. 02154

Reply NEDPL-C

Dear Colonel Scheider:

The East Boat Basin project in Sandwich, Massachusetts, as outlined in your announcement of 7 July 1980 is of interest.

The expanding commercial fishing fleet is in need of harbor refuge of this type.

The ever growing numbers of recreational boats, when traversing the Cape Cod Canal, have use for this facility.

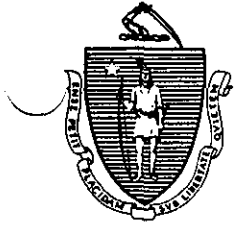
It is wise to keep in mind the possibility of contaminated dredge spoil being moved about, especially if marinas or marine railways have been in place over an extended period of time. Boat paints contain lead!

As the requirements regarding sewerage holding tanks aboard recreational vessels are enforced, the facilities for pumping-out become more important and the type and size involved is a critical component of this type boat basin. This will have an environmental impact on the contiguous land area or the treatment facility of the town.

Thank you for the opportunity to respond to your announcement.

Sincerely,

A handwritten signature in dark ink, appearing to read "Albert A. Swanson".
Captain Albert A. Swanson
MDC Historian



ANTHONY D. CORTESE Sc. D
Commissioner

PAUL T. ANDERSON
Regional Environmental Engineer

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
Southeast Region
Lakeville Hospital, Lakeville, Massachusetts 02346

July 15, 1980

Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

RE: Navigation Study for East Boat Basin,
Sandwich, Mass. - NEDPL-C

Dear Sir:

The Department of Environmental Quality Engineering, Southeast Regional Office, Division of Wetlands Protection, has reviewed the above-referenced project and would like to submit the following comments.

Although it appears from the July 7, 1980 Announcement that the proposed expansion of the East Boat Basin will involve primarily upland areas this office would like to bring to your attention the Massachusetts Coastal Regulations which were promulgated pursuant to Massachusetts General Laws, Chapter 131, Section 40, the Wetlands Protection Act. Certain Sections of the Regulations (i.e., Land Under the Ocean, Salt Marshes, Land Containing Shellfish, etc.) may apply to portions of the proposed work.

Please keep this office informed during the various planning stages so as to avoid any environmental conflict at a later date.

Thank you for your cooperation in this matter and if you should have any questions, please contact this office at 947-1231, ext. 224.

Very truly yours,

For the Commissioner

Paul T. Anderson, P.E.
Regional Environmental Engineer

A/jt/JB

cc: Conservation Commission

Michael Penny, CZM

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



P.O. BOX 660
SANDWICH, MASSACHUSETTS 02563
TELEPHONE 888-0187

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

July 23, 1980

Mr. Robert MacDonald
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Mr. MacDonald,

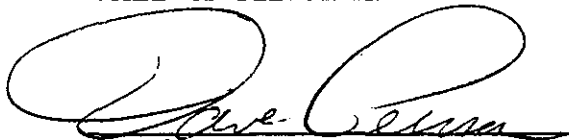
Some time ago, we discussed a chart which would show graphically what steps the Town of Sandwich has to pass through in order to accomplish construction of the East Boat Basin.

This chart will hopefully delineate both methods of funding and the resultant change in steps necessary. This chart would be very beneficial to us in both planning and keeping abreast of what we, the Town of Sandwich, have to accomplish in the years ahead.

Thank you for your assistance in this matter. We look forward to hearing from you in the future.

Very truly yours,

BOARD OF SELECTMEN



David P. Persson

DPP/jb

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



P.O. BOX 660
SANDWICH, MASSACHUSETTS 02563
TELEPHONE 888-0157

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

July 23, 1980

Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02154
Attn: Coastal Development/Major Seltz

Dear Major Seltz,

The Board of Selectmen has attempted to distribute as best we can the Navigation Questionnaires and other appropriate forms to the commercial fishermen, recreational boat owners, et al concerned with the East Boat Basin.


We have also notified the public through the media that forms are available in our office.

We will be glad to assist in collecting further data once the smoke has cleared and people who are going to return forms have done so.

We look forward to hearing from you in the near future.

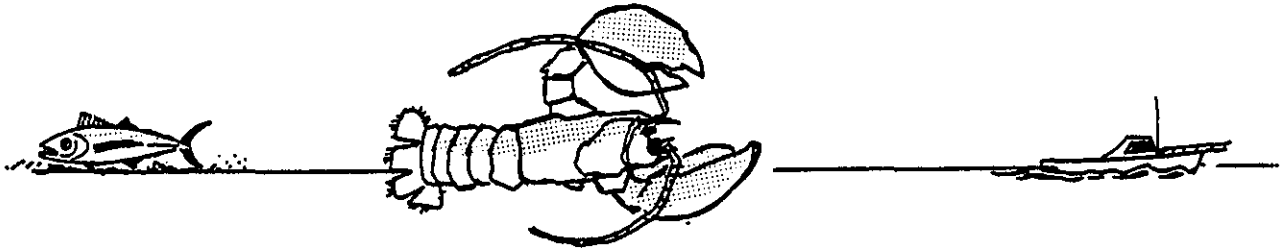
Very truly yours,

BOARD OF SELECTMEN



David P. Persson

DPP/jb



LIVING END FISHERIES INC.

Capt. Jim Smith

328-3078

222 HOLBROOK ROAD, QUINCY, MASS. 02171

759-3273

July 24, 1980

DIVISION ENGINEER
U.S. CORP. ENGINEERS
N.E. DIVISION
424 TRAPELO RD
WALTHAM, MASS.

DEAR MR. ABCDOWER:

I WOULD LIKE TO RECEIVE A COPY OF THE SURVEY INFORMATION
RECENTLY POSTED AT THE LOCAL POST OFFICES TITLED:

"CAPE COD CAVEL BOAT BASIN" # NEDPL-C DATED
7/7/80 SANDWICH BOAT BASIN.

I AM INTERESTED IN THIS EXPANSION PROPOSAL AND I WOULD
LIKE TO KEEP-UP TO DATE ON ITS FUTURE.

THANK YOU,

James E. Smith

July 30, 1980

Division Engineer
U. S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

I am writing with regards to the Navigation Study for the Expansion of the East Boat Basin at Sandwich on the Cape Cod Canal.


I am a recreational boat owner and have had a boat at the Sandwich Marina for about 12 years now. During this period I have seen the number of pleasure craft, as well as commercial fishing vessels increase many times, with the results of causing gross overcrowding of the facilities to the point of it being unsafe now when trying to approach your slip. On weekends, especially, there are as many as 27 boats anchored in the Harbor of Refuge, and of course, this is stretching the available space beyond its normal accommodations. There are times when the fishing vessels extend out beyond the exit and approach channel for the Coast Guard vessels and cause serious impedance to their safety missions.

The area needs to be expanded to include more facilities for larger craft of both fishing and recreational purposes. Sandwich is a natural jumping off point for boats transiting the Canal and headed to the North. The towns people would greatly benefit from the increased facility.

The anchorage needs to be swept and increased to a minimum of 12 feet. On Saturday, July 26, 1980, the ENCHANTRA, a 67' ketch drawing 19 feet grounded at MLW in the middle of the Harbor of Refuge.

The expansion program is needed desperately both for the safety of existing recreational and fishing vessels, and also for the increase in fishing activity which is necessary to the economic growth of the town.

Very truly yours,


Wallace S. Morrow III
Master, SS OGDEN CHAMPION
Yacht, PHOENIX



Sandwich Water District

72 TUPPER ROAD, BOX 600
SANDWICH, MASSACHUSETTS 02563

July 30, 1980

Division Engineer
U. S. Army Corps. of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02154

Re: East Boat Basin

Dear Colonel Scheider:

Enclosed is my response to your questionnaire regarding the East Boat Basin:

What kind of improvements and difficulties:

I believe that the present harbor is too small for pleasure boats, we could use at least twice as many docks, rack storage could supplement some of the needs of the families who only use their boat on weekends. Parking for the present harbor and the launching ramp is inadequate and over crowded.

The commercial fishing fleet only has one dock to tie up at, which at numerous times during the year it is not uncommon to see twenty to forty draggers tied side by side. If one boat, say should sink or catch fire the damage would be in the millions of dollars, a loss most of our local fishermen could never recover from. At these times when the weather or whatever forces the draggers in, the present Coast Guard rescue boats have been blocked off, which means time delays which could possibly mean life or death to the person or people waiting the arrival of the rescue boat.

The one dock that the lobstermen have serves about two dozen fishermen, which means costly delays in loading and unloading for these local men.

At present the fishermen have only one place to sell their fish and only one place to see their lobsters. Some of the small fishermen haul their catches to Hyannis, 17 miles one way or to Buzzards Bay, 8 miles one way.

We have only one gas dock which in the summer season if you are able to fuel up in say one hour you are lucky.

To sum up:

1. At least double the size of the harbor.
2. Increase the parking.
3. Provide dock space for commerical fishermen.
4. Bulkhead for additional space.
5. Provide space for additional services such as fish processing plants.
6. Rack storage for the smaller pleasure boats.
7. Improve the Coast Guard dock space.

Fishermen:

I am not a fisherman but would like to comment on a couple of items I feel are important. The draggers unloading at the bulkhead on the canal are frequently damaged when the wake of other boats force their boat into the pilings while they are unloading at the only place in Sandwich. Supplies for these men must come from New Bedford (about 35 miles one way) and for major repairs it is a long trip to Boston.

Recreational Boats:

Yes, I own one with my father, it is a Pen Yan, 20 foot, worth about \$5,000.00 moored in the present Sandwich Marina dock, used approximately 100 days a year. The improvement would mean less down time thereby we could use it more often. With the cost of dock space about \$1,500.00 per year, the cost of repairs would go down by having repair/service available.

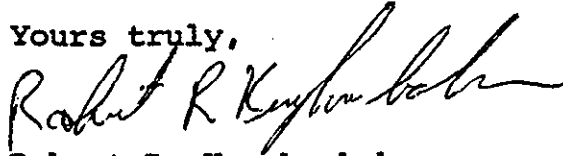
I don't own a business but the enlargement will provide jobs for the Town which is greatly needed in Sandwich. Economically the enlargement would have a far reaching effect on the community, not only by providing jobs and aiding all boaters, but also by enticing new business into the Town, more fishing boats, fish related business and it has to improve/increase the volume of business for all existing businesses. I would be willing to have Sandwich spend money for these improvements. The amount spent would be returned 100 fold to the Town with the benefits that the whole Town would realize economically from the increased fishing industry and pleasure boats.

I would like to thank you for allowing me to be of assistance to you in this very important stage of the planning of, hopefully our newly enlarged Boat Basin.

3.

If I can be of any further assistance, please feel free to call upon me.

Yours truly,

A handwritten signature in dark ink, appearing to read "Robert R. Kreykenbohm". The signature is fluid and cursive, with the first name "Robert" being more prominent.

Robert R. Kreykenbohm
Superintendent
Sandwich Water District

RRK/su

cc: David P. Perssons
Selectman, Town of Sandwich

Plankton Nets

888-1896

T. E. YOUNG

Rt. 130
Box 101
Sandwich, Ma.
02563

Oceanographic Equipment

Steel Fabrication

888-0442

August 5, 1980

Max B. Scheider, Colonel
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

East Boat Basin
Sandwich, MA

Dear Colonel Scheider,

I greatly appreciate the opportunity provided by the Corps of Engineers, for people directly involved with boating to express their opinion. I am fifty-one years old and have been continuously involved with boats, commercial and pleasure, since childhood. I was born in Hyannis, where my father had a machine shop and two marine railways with repair and building facilities. I have been doing welding and repairing on commercial and pleasure craft and shore facilities in Sandwich since 1947. I have also built a fifty foot, forty-one ton, gross, steel motor sailer for commercial use and is documented for research and fishing. This boat is in the basin now.

It is with this background that I would like to offer these suggestions and observations on the present harbor and the proposed expansion.

I think a major consideration should be the projected usage - given the fuel situation. A reasonable assumption is that pleasure craft usage will decline while commercial fishing changes to include some deep draft sailing and coal fired steam vessels. The existing harbor should be bulkheaded and future expansion bulkheaded except for ramps and railways.

Railways are in urgent need. The use of mobile rig for hauling larger vessels is dangerous and damaging. Large bollards should

be installed on the shore for commercial vessels in tying up and springing off when getting under way. A solid surface, not necessarily paved, should be provided adjacent to the bulkheads for work on nets, dredges, wire ranging, leading and unloading trucks etc.. Provisions for competitive repairing, refueling and provisioning should be made. A harbormaster with a marine background comparable with the projected usage as a commercial port and harbor of refuge should be strongly considered.

Attention should be paid to the commercial facilities of such ports as New Bedford, Gloucester, and Point Judith as a lot can be gained and learned from their many years of practical experience and this knowlege can be applied to Sandwich.

Provisions should be made for the maintainance and repair facilities to reduce replacement costs and to better insure the safety of people and boats.

Sincerely,

Theodore E. Young
Theodore E. Young



COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

August 6, 1980

Colonel Max B. Scheider
U.S. ARMY CORPS OF ENGINEERS
424 Trapelo Road
Waltham, Mass. 02154

Dear Colonel Scheider:

We are pleased to offer our full support for the Initiation of a Navigation Study for East Boat Basin, Sandwich, Massachusetts. We feel that the "Feasibility Study-East Boat Basin Expansion, Sandwich, Massachusetts" (Tibbetts Engineering Corp., April 1979, for the Town of Sandwich) provides excellent initial documentation that the navigation improvements can be economically justified and that there is widespread public acceptance of the concept. The Tibbetts Report cites that an initial investment of \$16 to \$19 million dollars could yield a benefit cost ratio of 5.6 to 1 and could result in a threefold increase in fish landings at the East Boat Basin (pp. 1 and 42-48).

Furthermore, Policy 14 of the Massachusetts Coastal Zone Management Plan provides conceptual support for the study and solution of fishery related problems. Policy 14 reads in part:

"Encourage and assist commercial fisheries research and development, restriction and management of fisheries resources..."

We might note that this Policy provided us with the initiative to partially fund the referenced study of the East Boat Basin expansion.

As you know, other MCZM policies present conditions for the conduct of various activities affecting marine resources. We expect to be closely working with you during all stages of the Navigation Study to ensure that final plans for the East Boat Basin are consistent with CZM policies dealing with construction in or modification of coastal resources and dredging and disposal.

Finally, several CZM staff members are very familiar with fishery management and resource development issues in Massachusetts. During the next several weeks they will be searching for and gathering together information that may be useful to you in Phase I of the Navigation Study. At any time during your study, you or any of your staff are welcome to call on us for consultation or specific assistance. Mr. Michael Penney of our staff will be happy to coordinate any such requests.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ed J. Reilly", written in a cursive style.

Edward J. Reilly
Assistant Secretary

EJR/MEP:dc

cc: Bill Taylor, Town Engineer, Sandwich
Marta Braiterman, Regional Coordinator, CZM

E.T. MOFFITT CORPORATION

MANAGEMENT CONSULTANTS
BUSINESS MANAGEMENT

68 Town Neck Road

Sandwich, Massachusetts 02563

Telephone 888-1059

August 7, 1980

Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

RE: Navigation Questionnaire

The depth in the basin is not sufficient at low water for deep draft vessels. 12 ft. to 16 ft. is needed for draggers and keel sailboats.

The Sandwich Marina is leased from the U.S. Corp of Army Engineers. Facilities at this time, a launching ramp, slips for boats from 16ft to 50 ft. with 12 slips open for transient.

At present we hold reservations for all slips thru Labor day. Our permanent slips have a waiting list dating back to 1973 totaling 233 applications. All slips are filled in the Winter season by pleasure boats or fishing draggers. Facilities for fishing draggers and lobstermen are very inadequate.

There is no space left for any lobster boats to tie to the shore and anchor off. Commercial boats are forced to tie to one pier and raft off in two rows as much as 15 or more deep. There is no water or electricity available. Unloading must be done at the bulkhead on the Cape Cod Canal. When weather blows hard out of the N W to N E draggers swing and block the Coast Guard dock. Winds out of the S W swings them to the riprap

Every year more draggers attempt to tie to the pier creating a serious problem. The dredging of the basin along with additional berths to tie up will eliminate much of the problem.


E.T. Moffitt

Harbormaster
Sandwich Cape Cod Canal Marina

LANDING INFORMATION SHEET
(For Use With Navigation Questionnaire)

Please cross out those of the following which do not apply:

~~Commercial Landing~~

~~Public Landing~~

~~Recreational Landing~~

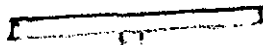
Name of Landing *Sandwich EAST BOAT BASIN Commercial Dock*

Owner(s) *U.S. Corp of Army Engineers*

Location *Sandwich EAST BOAT BASIN Sandwich Is.*

Type of Construction *Piles with wooden deck*

Dimensions *100' Long*



Depth and length of berth(s) *RAFT to pier 10-12 + deep 2 Rows*

Kinds of unloading facilities *Bulk head on Cape Col. Penn.*

Kinds of storage facilities *None.*

Is railroad siding available? Yes ☐ No ☒

Is truck access available? Yes ☒ No ☐

Is Water available? Yes ☐ No ☒

Is fuel available? Yes ☒ No ☐

What wharf fee is charged? *None*

If landing is only partly open to public, explain. *Pier is open to Commercial Druggists and Lobster Boats only. 17 Lobster Boats Tie To the shore with Stern Anchor out in the Basin. Number of boat owners or shipping concerns using landing or pier up to 20 at Pier - Also using Bulkhead on the Cape.*

What is condition of landing? Excellent ☐ Good ☐ Fair ☒ Poor ☐

Incl. No. 1 to Navigation Questionnaire No. 2

Mr. Moffitt

BOAT YARD INFORMATION SHEET
(For use with Navigation Questionnaire)

Name of Boat ~~yard~~ *ALPHA Sandwich (Gep-Cod) PAINT MARINE*

Owner(s) *Lease Vt. Govt to Town of Sandwich*

Location *EAST BOAT BASIN*

Size of boats that can be serviced *To 50'*

Number of railways

Capacities of railways or Launching equipment *HAULING/Launching done by TRAC TRAILERS*

Kinds of repairs and servicing available *All Services available or by independent service people - RE HAULING - Engine repairs - Electronics - Wood - Fiberglass - PAINT Hull work*

Number and size of boats that can be stored

Covered

Open *50'*

Berths *80*

Moorings

Average number of boats serviced last year* *40-50*

Average number of boats stored last year* *102*

Approximate average gross valuation of business last year*
*DOCKAGE AND WINTER STORAGE plus Fuel *200,000**

*Have these figures changed during the past five years?

Explain. *Yes increased from \$70,000 to \$200,000*

We have on hand 232 Applications for Berths dating back to 1973 which we cannot process because of lack of space.

Incl. No. 2 to Nav. Questionnaire No. 2

40 Grove St.
Sandwich, Mass 02563
10 Aug 1980

Dear Sir,

A few brief comments in response to the Navigation Questionnaire for the East Boat Basin, Sandwich.

If possible at the expense of the Federal Government more fishing interests would make use of this area. I would encourage it. However, what would the rental of slips be, who would get that money?

Under no circumstances should Town money be spent to benefit recreational boaters. I do not think the taxpayer should be burdened by something that would only benefit a few, and most of them not town residents.

Time does not allow me to respond to this subject further.

If in the future you have further questions I would be glad to comply.

Sincerely,
John G. Stein
John G. Stein

**SANDWICH
CAPE COD CANAL
MARINA**

BOX 152 SANDWICH, MASS. 02563
TEL. 688-2500

August 18, 1980

Planning Division
New England Division
Corp. of Army Engineers
424 Trapelo Road
Waltham, Mass. 02254

Re: Permanent and Transient Slips
Sandwich Marina

Length of Slips	out board	in ^(STEAM) board	power	sail	Trns.	Total	Application on file	oldest Date
Boats up to 20'	20	1			1	22	62	May 72
" 20 to 24'	1	4	13	1	3	22	56	Apr. 72
" 25 to 28'			9		1	10	51	June 72
" 29 to 33'			12		2	14	27	May 73
" 34 to 40'			7		5	12	19	Aug 73
" 41 to 43'			4		2	6	12	Aug. 73
" 44 to 50'			4			4	8	June 74
TOTAL	21	5	49	1	14	90	235	

1979 A total of 733 transients used slips some overnight others
a week or so.

1980 To date 8/17 537 transients used slips with advance reservations
filling all transient slips thru Labor day and some thru Oct. 15.

This past week alone we were unable to accomodate 42 boats that asked
for slips without reservations.

The harbor of refuge sometimes fills to capacity with up to 50 boats
at anchor. (see photo)

E. M. Moffitt
E. M. Moffitt
Sandwich Harbor Master

cc Selectmen Town of Sandwich



Philip G. Coates
Director

The Commonwealth of Massachusetts
Division of Marine Fisheries

~~Lowell State Office Building~~

~~100 Cambridge Street, Boston 02202~~

18 Heritage Professional Building

Route 6A RFD 1, Sandwich, MA 02563

August 25, 1980

Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02154

We, the Cape and Islands Area Team of the Massachusetts Division of Marine Fisheries, have been requested by the Sandwich Board of Selectmen to respond to the Initiation of a Navigation Study, East Boat Basin, Sandwich, Massachusetts.

Rather than answer the specific questions posed on the navigation questionnaire, along with several information sheets, we have composed a status report on commercial fishing activities in the Sandwich Basin. Our report encompasses information pertinent to Stage 1 investigations.

If we may help to provide any further information, please contact us in Sandwich.

H. Arnold Carr, Marine Fisheries Biologist
Elizabeth Amaral, Assistant Marine Fisheries Biologist

Elizabeth Amaral

CC to: J. Fair, Assistant Director
Board of Selectmen, Sandwich

Sandwich East Boat Basin Commercial Fisheries Status

The Sandwich East Boat Basin is one of four major fishing ports on Cape Cod. In terms of pounds of fish landed and associated value on Cape Cod, Sandwich has ranked second to the port of Provincetown over the last three years; overall in Massachusetts, Sandwich ranks fifth in landings. In 1975, the first year for which complete landings are available, 6,383,000 lbs of fish were landed with a value of \$1,753,000 (Table 1). In 1979, 17,488,000 lbs were reported, valued at \$9,848,000. This does not include swordfish (Sandwich being a major swordfish port on the East Coast) at an estimated value of \$2 million (pers. comm. Fed. Port Agent). Principal species landed are yellowtail flounder, winter flounder, cod, haddock, sea scallops, and lobster (both from pots and draggers). Canal Marine, the Cape's largest freezer facility, is a major offloading site for sea herring, menhaden and squid. In the month of September, Sandwich becomes a center of activity for two tuna seiners. Their high priced catch is processed for direct air shipment to Japan. As recent economic studies show¹, these landings generate a value to the local economy that may reach four times the landed value, before the fish reach retail markets. If this can be applied to Sandwich, this may mean a value to the community economy approaching \$68 million.

The number of commercial vessels which call Sandwich "home" on a year-round basis fluctuates between 17 and 20. They are principally inshore draggers and sea scallopers, collectively in the range of 30-50'. The inshore commercial lobster fleet numbers 17-18 boats (1980) during the spring through fall. During 1979-80 six sea clam boats (with hydraulic dredge) have periodically made Sandwich their base of operation, working nearby clam beds in Cape Cod Bay.

Several of these boats are from Rhode Island. The size of the dragger fleet, although having a "core" of Sandwich vessels, fluctuates with the seasons and fisheries, such that vessels from Plymouth and New Bedford, for instance, may remain here up to several months if fishing is favorable nearby and/or weather dictates moving from their home port. These commercial vessels must raft (tie off, one to the next) together in two rows which has meant as many as 20 vessels per row, 40 vessels total, extending from the commercial dock to the entrance of the Basin. The lobster fleet utilizes moorings just off the rip-rap in the summer. When the recreational fleet leaves the inner Basin in late fall, the commercial vessels occupy the vacated slips (up to 50 additional vessels); this is a common phenomenon on Cape Cod in the winter months when competition for dockage decreases.

The transient fishing fleet is peculiar to the Sandwich Basin in that it utilizes the port principally for offloading (at one of four fish dealers along the Canal) and less for layover, supplies or refueling. At least 50 vessels offload at the Atlantic Coast Fillet Co. in the course of a year, coming from Sandwich, New Bedford, Westport, Scituate and occasionally, Martha's Vineyard, Rhode Island and North Carolina. This figure is based on those fishing craft which offload routinely there, but are not company-owned vessels. A new fish company, occupying the building furthest east on the bulkhead, will shortly have its own vessels fishing and landing (3-4) in addition to transients. At Canal Marine, large (up to 70') purse seiners and pair trawlers from New Bedford, Rhode Island and Hyannis offload herring during late fall and winter. Throughout the rest of the year, redfish and herring are trucked to Canal Marine freezer from other New England ports. Joe's Lobster Mart is a major lobster retail/wholesale facility which serves inshore and offshore lobster fleets.

Commercial attraction to the East Boat Basin can be summarized by the following:

- 1) It is a deep water port capable of unloading and docking fishing vessels with a draft more than 15 feet and 10 feet, respectively. (However, unloading can only take place along the outer bulkhead). This harbor of refuge can be considered a deep water port by Cape Cod standards and is one of three on the Cape.
- 2) Its virtually ice-free access and condition during the winter have permitted fishing operations to continue when most other ports are closed.
- 3) Its close proximity to productive fishing grounds, both on the north and south side of Cape Cod, allows the vessels to fish for species available throughout the year as well as those available seasonally.
- 4) It is a convenient, sometimes central, location for vessels transitting between other ports and the fishing grounds. This is reflected in the large number of transient vessels that unload here (mentioned above).

Despite the commercial attraction to the Basin, problems do exist for both transient and home-port vessels of the commercial fleet. For the latter, the existing commercial dock serves no purpose other than a "support" on which to tie the first vessel in line for rafting. It rarely serves as an offloading dock, due to its size and inaccessibility in this rafting situation. At best, it can be used by the fishermen as a platform to board their craft. Loading and offloading gear or other heavy equipment as well as refueling must be done along the outer bulkhead in the canal, unless vessels buy fuel at the Basin fuel dock.

The rafting situation is dangerous although it is presently the only form

of 'docking' for the larger commercial vessels. As mentioned previously, as many as 20 boats have tied together causing potentially hazardous navigation in the Basin, vessel damage and blockage of the Coast Guard's path. Rafting pressure increases during inclement weather, particularly in winter when the Basin is used for refuge.

More transient craft might utilize the Basin if it were not for the overcrowded conditions, coupled with basic lack of facilities - no railway, no repair shop or chandlery. Although exact figures are not known, many fishermen have made it clear they would move to Sandwich permanently if conditions were more inviting.

Even offloading is a problem: the outer bulkhead where unloading takes place is exposed to the hazards of high winds and seas. Vessels may tie up there for only short periods of time. Increased and protected offloading space to accomodate more than one vessel at a time would be desirable. We do feel, however, that the fish companies should speak out individually on this matter.

These conditions depict the present status of commercial fishing activities in the Sandwich Basin combined with input from the commercial sector. The Basin presently provides a limited facility for the commercial fleet. We feel that minimum improvements should encompass the following:

- 1) Increased and adequate docking space, to include bulkheading.
- 2) Multiple as well as protected offloading space.
- 3) Commercial support facilities.

¹King and Storey. 1974. Use of Economic-Environmental Input-Output Analysis for Coastal Planning with Illustrations of the Cape Cod Region. U-Mass. Publication No. 40 Special Report.
Callaghan and Comerford. 1977. Modified Regional Input-Output Analysis of Rhode Island Commercial Fishing and Related Activities. New England Journal Bus. and Econ. 3(2).

Table 1.

Sandwich - Commercial Landings

Year-End Totals, 1975-1979

	<u>Pounds</u>	<u>Total Landed Value</u>
1975	6,383,000	\$ 1,753,000.
1976	11,845,000	4,359,000.
1977	15,340,000	5,045,000.
1978	19,021,000	7,778,000.
1979	17,488,000	9,848,000.

Federal Fishery Statistics



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. Box 1518
Concord, New Hampshire 03301

SEP 08 1980

Colonel William E. Hodgson
Deputy Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Hodgson:

This letter is intended to aid in your planning of navigation improvements for the East Boat Basin at Sandwich, Massachusetts. It is submitted under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The East Boat Basin is seven acres in extent and located on the south side of Cape Cod Canal near its eastern end. Spoil from the 1964 dredging of 4.3 acres to a depth of 8 feet was placed on the south side of the harbor. The original 2.7 acres of the harbor was dredged to a depth of 13 feet and the spoil was placed on a disposal site located offshore from the eastern end of the canal.

We understand the current study is to determine the Federal Government's interest in participating in a harbor enlargement using 11.1 acres of town-owned land for excavation of additional space for commercial fishing boats and a contiguous lot of 11.4 acres for support facilities. Excavation of about a million cubic feet is expected. The town-owned lots include the old spoil area. The existing harbor will be dredged to a depth equal to the depth chosen for the new area but not exceeding 16 feet. Disposal of dredged spoil at the offshore site used for the previous spoil and disposal of excavated material from the old spoil site at upland locations is being considered.

Dredged material from the harbor should be subject to core sampling, bulk sediment, and elutriate tests to determine (a) the relative proportion of sands, gravels and silts, and (b) its level of contamination. Use of the harbor by large numbers of boats may have resulted in deposits of metals such as copper, lead and zinc from paints scraped from and applied to boat hulls and from other boat-related sources.

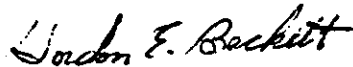
A survey of benthic organisms will be necessary to determine the biological activity on the harbor substrate, since we have found no publications on benthic species in the harbor. There is no shellfishing. The large number of boats crowded into the harbor could be limiting the benthic community. Finfish such as menhaden, mackerel, cunner, and other species enter the harbor at various times but the harbor is not considered significant habitat for these species.

A wildlife community has developed on the old spoil site which has a general elevation of about 11 feet above mean high water. The vegetation is dominated by grasses tentatively identified as Spartina spp., other unidentified grasses; shrubs such as bayberry, sweet gale, poison ivy, and other species. A narrow band of deciduous trees is located along the railroad tracks at the south end of the spoil site. Habitat for small mammals, songbirds, and possibly shorebirds is provided at the site. The quality of this habitat and identification of resident, nesting, and transient species of songbirds and transient or resident mammals needs to be determined so that an evaluation of habitat losses and possible mitigation measures can be accomplished. Therefore, your studies should include funds for a detailed evaluation of the vegetative and wildlife communities. We have found no reports concerning terrestrial habitat at this site.

Your study also should include consideration of beneficial use of the spoil from the harbor so that offshore disposal can be avoided. In addition, the frequency of future maintenance dredging should be determined in your studies as well as selection of a site or use for maintenance spoil.

The Massachusetts Division of Marine Resources plans to conduct finfish studies at a number of potential sites for the disposal of spoil including the site proposed for this project. These studies will start this fall and are being done under the auspices of the Massachusetts CZM program and will include benthic investigations. These studies should provide information on the biological communities existing at the proposed spoil site.

Sincerely yours,



Gordon E. Beckett
Supervisor

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



SANDWICH, MASSACHUSETTS

TELEPHONE 582-4000 ⁰¹⁵⁷

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

October 3, 1980

Dirk Zwart, Project Manager
Sandwich East Boat Basin
U.S. Army Engineer Division
New England Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Mr. Zwart,

The Board of Selectmen would like to thank you for this opportunity to respond to Navigation Questionnaire Form #2 concerning the proposed expansion of the East Boat Basin.

You have been provided with various information concerning the fish landings, commercial facilities, commercial boat numbers, recreational boat numbers and a whole assortment of required statistics. What I propose to do is provide a general overview of the project as seen by the Board of Selectmen.

1. DESCRIPTION OF IMPROVEMENT WANTED. The purpose of the expansion is to promote and facilitate commercial fishing from the port of Sandwich. Presently Sandwich ranks fifth in Massachusetts in total fish landings. What is desired is to expand the present harbor facility utilizing a 22 plus acre site which has been acquired by the Town of Sandwich. Through the Coastal Zone Management Program, we have completed a very preliminary study as to what the Town would see as a desirable expansion. This report, prepared by Tibbetts Engineering, is enclosed. You will please note there are two different proposals for improvement. We are certainly open to proposals that accomplish our declared goal. The Town relies upon the expertise of the Corps of Engineers in designing the actual site, maximizing the Corps participation in the project. I think you will find that the Tibbetts report is a reasonably complete view of the project, but please bear in mind that our main intent for the expansion is commercial fishing.

2. DESCRIPTION OF PRESENT NAVIGATION DIFFICULTIES. Presently the four fish handling facilities are located on the banks of the canal; therefore, boats must be tied up in the canal and offloaded, presenting navigational problems as well as a hazardous condition. Moreover, on the interior of the present harbor there is one pier for commercial fishing boats. The pier, designed for six, presently handles in excess of 35 boats. During the winter months when the recreational fleet is removed from the present harbor facility, the commercial vessels occupy those existing slips and still continue to raft off this one pier. Thus, we are left with two distinct difficulties:

- a. Offloading in the Cape Cod Canal of fishing boats to handling facilities.
- b. A grossly overcrowded facility for commercial vessels.

3. LANDING AND SERVICING FACILITIES IN THE HARBOR.

- a. Commercial Landings. There are presently four fish handling facilities located on the banks of the canal (see attached form).
- b. Recreational Landing. Presently there is one boat launching facility in the East Boat Basin.
- c. Public Landings. The recreational landing described above also functions as a public landing. We would sincerely hope that in the new expanded facility increased public access would be achieved as the present landing is grossly over-used.
- d. Boat Yards and Repair Facilities. There is presently no boat repair facility on site. We would propose that in the final site preparation, that land be provided for such a facility.
- e. New Facilities Planned. With the proposed expansion we propose to create several fish handling facilities for off-loading within the new harbor. Moreover, we intend to have provided rack storage for recreational boats. Again, please consult the Tibbetts Report. It gives a general idea as to what type of facilities we will be striving for.

4. PRESENT USE OF THE HARBOR.

- a. Fishing Industry. You should find that the Massachusetts Marine Fisheries has responded with great depth, providing you with adequate information in this area. We will be happy to provide any additional information.
- b. Recreational Boating. The Harbormaster has provided your office with detailed information as to the extent of recreational boating. Again, if further information is needed, please contact us.
- c. Charter Boats. Presently there are none at the existing facility and we are undecided as to whether they will be included in the final facility.
- d. Ferries. None.
- e. Other Commerce. None.

- f. Special Problems. There is a special condition not necessarily a problem which exists at the East Boat Basin. The outfall of warm water from Canal Electric into the Cape Cod Canal occurs 400 yards to the west. This water tends to prevent the boat basin from icing. We would propose in the facility that a conduit be constructed from the canal outfall to the East Boat Basin, connected to perforated pipe which would lie at the bottom of the facility. Further, this conduit would be flooded with warm water in late Fall and shut off in early Spring, thus aiding this ice-free feature, yet helping to prevent the problem of ship worms.

5. STORM DAMAGE. The East Boat Basin presently functions as a harbor of refuge, and this of course would be preserved under the expansion program.

6. WOULD YOUR COMMUNITY BE WILLING TO CONTRIBUTE MONEY TO THE IMPROVEMENT OF THE HARBOR? Prior to the involvement of the Corps of Army Engineers, the Town of Sandwich purchased 22 plus acres of land adjacent to the present facility. However, we realize that this commitment is merely just the beginning. There will be expenditures of funds for bulkheading, for site preparation, relocation and location of utilities, and a host of other shore facilities. The funding for the above improvements will be sought through a combination of private and local funds. Thus, the Town of Sandwich is very aware that it must contribute to make the expansion of the East Boat Basin a success. We are currently pursuing additional Federal funds to accomplish adequate site preparation, the first step in an arduous process in obtaining needed funds.

Very truly yours,

BOARD OF SELECTMEN



David P. Persson

DPP/jb

Enc.

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



SANDWICH, MASSACHUSETTS

TELEPHONE 888-4200

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

January 19, 1981

Colonel William E. Hodgson, Acting Div. Eng.
Department of the Army
New England Division, Corps of Engineers
Waltham, MA

Dear Colonel Hodgson,

The Sandwich Board of Selectmen would like to express their sincere appreciation for having this opportunity to review the Reconnaissance Report of Navigation Improvements for the East Boat Basin, Sandwich, Massachusetts. We find that the report has captured the critical nature of the existing problems with respect to commercial berthing and off-loading. Moreover, you have analyzed the critical economic problem Sandwich faces -- unemployment. It should be noted that the unemployment problem, clearly at its worst during the winter months, remains considerably higher during the summer months than Barnstable County or indeed the Commonwealth of Massachusetts.

We would like to emphasize three points concerning the expansion of the East Boat Basin. First, the Board of Selectmen wish to place clear and definite emphasis upon commercial fishing within the expanded area. Recreational interests, we feel, can best be accommodated through the use of rack storage for smaller power boats and a better layout of slip space using the existing water space.

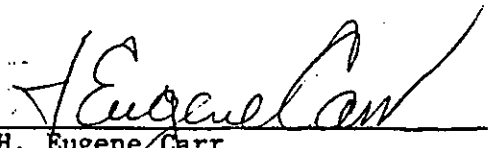
Second, we would like to point out that the Tibbets Report and the two layouts of expansion, are merely guides to indicate our interest in expansion. They should not be regarded as definite and absolute proposals, rather as tools to express our desires.

And third, it is essential that federal dollar participation in this project be maximized for this plan to succeed. The Town of Sandwich with its \$7,000,000. budget cannot afford a great share of the cost of "digging the hole". We understand clearly our financial responsibility concerning the bulkheads, piers, and docks, as well as the site preparation. Therefore, we request of the Corps of Army Engineers a design of expansion, commercially directed, which maximizes federal cost sharing.

Again, thank you for this opportunity to discuss these matters with you.

Very truly yours,

BOARD OF SELECTMEN


H. Eugene Carr
Chairman

HEC/jb

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



P.O. BOX 660
SANDWICH, MASSACHUSETTS 02563
TELEPHONE 888-0157

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

July 15, 1981

Mr. Dirk Zwart
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA

Dear Mr. Zwart,

Thank you for calling this office requesting additional comments regarding the Stage Two Study of the East Boat Basin on the Cape Cod Canal.

You asked how large an area around the basin would receive some impact from this expansion. The 22 acres of town-owned land immediately surrounding the basin of course is the area which will have the greatest development impact. How this area is developed also depends on how large the expansion will be and what type of shoreline - whether it will be rip-rap or bulkheading or a combination of both. We still prefer the bulkheading method to get the greatest amount of useable area for both the basin and the support shore facilities. The town-owned land will be the area the Town will be directly involved in for planning and development.


The town-owned land undoubtedly will be all marine related facilities. Some businesses have already been built in the immediate area and many more undoubtedly will follow.

I am enclosing a zoning map of the Town of Sandwich and you can see from the map that the potential for marine related businesses is certainly a possibility.

I hope this answers the questions you raised. Please feel free to call on me on any subject you feel this office can be of help to you during this expansion.

Very truly yours,

BOARD OF SELECTMEN


J. Louis Roberti
Chairman

JLR/jb

Enc.

NEDPL-C

10 August 1981

Mr. Joseph Bekoff
Atlantic Coast Fillet Co., Inc.
East Boat Basin, Cape Cod Canal
Sandwich, MA 02563

Dear Mr. Bekoff:

Reference is made to the meeting you had with members of my staff on the afternoon of 28 July 1981, concerning our ongoing navigation study for the expansion of the East Boat Basin in Sandwich. We wish to thank you for giving us the opportunity to discuss your fish offloading operation and the Sandwich fishing industry with us. As discussed at the meeting, we need updated information on the number of landings (vessel trips), pounds per specie and ex-vessel value per specie for the fish landed at your facility during 1978, 1979, and 1980. This information will help us to establish a base of information from which future conditions can be projected.

Also, utilizing your knowledge of the fishing industry, we would appreciate an estimate from you, as to how an expansion of the East Boat Basin would impact your operation. On the average, what changes do you anticipate in terms of number of vessel offloading trips and number of pounds per specie landed annually.

You can be assured that the specific information that is submitted by you will not be published in any public documents except in aggregate form.

Your cooperation in this matter is appreciated. Should you have any questions, feel free to call Mr. Dirk Zwart of my staff, at 894-2400, extension 550.

Sincerely,

cc: Coastal Dev. Br.
Reading File
Planning Div. File

JOSEPH L. IGNAZIO
Chief, Planning Division

Same letter sent to:

Mr. Joseph Vado
Joe's Lobster Mart
East Boat Basin, Cape Cod Canal
Sandwich, MA 02563

Mr. Wayne Bassett
Canal Marine, Inc.
East Boat Basin, Cape Cod Canal
Sandwich, MA 02563

NEDPL-C

18 August 1981

Mr. William Blinn
R&D Seafood Emporium
P.O. Box 783
Sandwich, MA 02563

Dear Mr. Blinn:

Reference is made to a telephone conversation you had with Mr. Dirk Zwart of my staff on 10 August 1981, concerning our ongoing navigation study for expansion of the East Boat Basin.

Although you were unable to attend our meeting of 28 July 1981, it is still desirable to have your input for our study. We need to obtain historic data and information on the existing conditions of the Sandwich fishing industry, in order to develop a base of information that will assist us in making a reasonable projection of future conditions at the East Boat Basin.

As discussed with Mr. Zwart, we need updated information on the number of landings (vessel trips), pounds per specie and ex-vessel value per specie for fish landed at your facility. Also, we would appreciate some general comments on the present and future conditions of the commercial fishing industry in Sandwich. Information should include the general operations of your facility, the problems associated with operating on the bulkhead, and an estimate of how an expansion of the East Boat Basin would affect your operation. Concerning future conditions, changes that you anticipate in terms of number of landings and number of pounds per specie landed annually would be appreciated.

You can be assured that the specific information that is submitted by you will not be published in any public documents except in aggregate form.

Your cooperation in this matter is appreciated. Should you have any questions, feel free to contact Mr. Dirk Zwart of my staff, at 894-2400, extension 556.

Sincerely,

JOSEPH L. IGNAZIO
Chief, Planning Division

cc: Coastal Dev. Br.
Reading File
Planning Div. File

NEDPL-C

19 AUG 1981

Mr. Allen Peterson, Regional Director
National Marine Fisheries Service
Northeast Region
14 Elm Street
Gloucester, MA 01930

Dear Mr. Peterson:

Reference is made to the meeting of 31 July 1981 you had with members of my staff at your office in Gloucester, Massachusetts, concerning the East Boat Basin navigation study.

We are presently engaged in obtaining information concerning the commercial fishing industry at Sandwich. A critical parameter in our plan formulation process is the determination of the existing marine resource and its capability to support the future potential development of the basin. Therefore, your expertise in this field is requested to assist us in determining the future fishery resource and its sustainable yield which will support future development of the East Boat Basin.

To provide you with a better understanding of present activities at the East Boat Basin, the following information is provided.

The Sandwich fishing industry is based mostly on a transient fishing fleet. Vessels from other ports offload the major percentage of fish landed at Sandwich and are mostly offshore fishing boats; therefore, most of the fish presently landed are taken from the offshore fishing areas, such as George's Bank. The table below presents the total aggregates and value of fish landed at Sandwich for the past several years. In addition, the attached table provides a breakdown of species, pounds and value for 1977, which provides a good indication of the types of species and the total pounds of each specie landed at Sandwich.

19 AUG 1981

NEDPL-C

Mr. Allen Peterson, Regional Director

SANDWICH FISH LANDINGS (1975-1980)

<u>Year</u>	<u>Pounds</u>	<u>Value</u>
1975	6,383,000	\$1,573,000
1976	11,845,000	\$4,359,000
1977	15,340,000	\$5,045,000
1978	19,021,000	\$7,778,000
1979	17,488,000	\$9,848,000
1980*	14,200,000	\$7,400,000

Sources: Commonwealth of Massachusetts, Division of Marine Fisheries
* National Marine Fisheries Service

In order for you to get some idea of the future potential of an expanded East Boat Basin in terms of marine resource handling capability, the following information is provided. We anticipate that a maximum plan of expansion would increase the existing fleet by 60 vessels for a total of 100 vessels. Typical vessels would be in the 75-85 foot range. Based on preliminary analyses, we anticipate that the resource handling capability of the maximum expansion would be on the order of 30-40 million pounds of marine resource annually. This would bring total capability at Sandwich to about 35-50 million pounds annually.

We request that you examine the above information and provide us with comments concerning the ability of the marine resource to sustain an operation of this magnitude. If you feel that the projected maximum capability cannot be sustained, please provide us with the level of marine resource available which will sustain additional development at the East Boat Basin.

In either of the above instances, we would appreciate that you present what the potential opportunities are for the Sandwich fishing industry in meeting the available resource level. We are interested in what species have potential for increased levels of harvesting. How much would the potential increase be? Would these increases be in the inshore fleet or the offshore fleet? How many vessels of each type could be supported by the potential growth? What would be Sandwich's share in this growth? If you have any additional information you feel would be beneficial to us concerning this matter, please feel free to incorporate it into your response. This information will be very helpful to us in determining what the future of the Sandwich fishing industry may look like, thereby increasing the possibility of developing plans that maximize efficient utilization of the basin.

NEDPL-C

19 AUG 1981

Mr. Allen Peterson, Regional Director

Your cooperation in this matter is greatly appreciated. Should you have any questions please feel free to contact me at 894-2400, extension 508. Mr. Dirk Zwart of my staff is coordinating the investigation. Should your staff desire additional information, he can be reached at extension 556.

Sincerely,

Incl
as stated

JOSEPH L. IGNAZIO
Chief, Planning Division

cc: Coastal Dev Br'
Reading File
Plng Div File

SPECIES, POUNDS, AND VALUE LANDED
ALL BOATS
PORT OF SANDWICH, 1977

<u>Species</u>	<u>Pounds</u>	<u>Value</u>
Yellowtail	2,700,000	1,377,000
Sea Scollop	670,198	1,110,000
Blackback	2,275,809	780,000
Cod	1,609,578	466,000
Bluefin Tuna	382,057	414,000
Lobster	277,656	455,468
Sea Herring	5,795,011	201,000
Haddock	541,286	180,000
Fluke	288,333	173,000
Ocean Dab	239,293	79,000
Greysole	134,146	55,000
Sand Dab	229,167	55,000
Monk Tail	148,649	55,000
Squid	76,941	23,000
Pollock	123,529	21,000
Scup	48,148	13,000
Sea Bass	12,125	9,000
Whiting	38,580	4,000
Crab	16,000	4,000
Hake	8,696	2,000
Wolf Fish	21,164	2,000
Halibut	930	2,000
Mackerel	5,883	2,000
Cusk	5,882	1,000
Butterfish	2,702	1,000
Other	<u>5,000</u>	<u>1,000</u>
Total	15,656,763	\$5,485,468

01 SEP 1981

Philip C. Coates, Director
Division of Marine Fisheries
100 Cambridge Street
Boston, MA 02202

Dear Mr. Coates:

This letter concerns our ongoing navigation study for the expansion of the East Boat Basin in Sandwich, Massachusetts. Reference is made to the meeting of 28 July 1981 held in Sandwich, in which members of my staff discussed the Sandwich fishing industry with Ms. Elizabeth Amaral and Mr. John Fiske of your staff.

We are presently engaged in obtaining information concerning the commercial fishing industry at Sandwich. A critical parameter in our plan formulation process is the determination of the existing marine resource and its capability to support the future potential development of the basin. Therefore, your expertise in this field is requested to assist us in determining the future fishery resource and its sustainable yield which will support future development of the East Boat Basin.

To provide you with a better understanding of present activities at the East Boat Basin, the following information is provided.

The Sandwich fishing industry is based mostly on a transient fishing fleet. Vessels from other ports offload the major percentage of fish landed at Sandwich and are mostly offshore fishing boats; therefore, most of the fish presently landed are taken from the offshore fishing areas, such as George's Bank. The table below presents the total aggregates and value of fish landed at Sandwich for the past several years. In addition, the attached table provides a breakdown of species, pounds and value for 1977, which provides a good indication of the types of species and the total pounds of each specie landed at Sandwich.

01 SEP 1981

Mr. Philip G. Coates, Director

SANDWICH FISH LANDINGS (1975-1980)

<u>Year</u>	<u>Pounds</u>	<u>Value</u>
1975	6,383,000	\$1,573,000
1976	11,845,000	\$4,359,000
1977	15,340,000	\$5,045,000
1978	19,021,000	\$7,778,000
1979	17,488,000	\$9,848,000
1980*	14,200,000	\$7,400,000

Sources: Commonwealth of Massachusetts, Division of Marine Fisheries
 *National Marine Fisheries Service

In order for you to get some idea of the future potential of an expanded East Boat Basin in terms of marine resource handling capability, the following information is provided. We anticipate that a maximum plan of expansion would increase the existing fleet by 60 vessels for a total of 100 vessels. Typical vessels would be in the 75-85 foot range. Based on preliminary analyses, we anticipate that the resource handling capability of the maximum expansion would be on the order of 30-40 million pounds of marine resource annually. This would bring total capability at Sandwich to about 35-50 million pounds annually.

We request that you examine the above information and provide us with comments concerning the ability of the marine resource to sustain an operation of this magnitude. If you feel that the projected maximum capability cannot be sustained, please provide us with the level of marine resource available which will sustain additional development at the East Boat Basin.

In either of the above instances, we would appreciate that you present what the potential opportunities are for the Sandwich fishing industry in meeting the available resource level. We are interested in what species have potential for increased levels of harvesting. How much would the potential increase be? Would these increases be in the inshore fleet or the offshore fleet? How many vessels of each type could be supported by the potential growth? What would be Sandwich's share in this growth? If you have any additional information you feel would be beneficial to us concerning this matter, please feel free to incorporate it into your response. This information will be very helpful to us in determining what the future of the Sandwich fishing industry may look like, thereby increasing the possibility of developing plans that maximize efficient utilization of the basin.

NEDFL-C

01 SEP 1981

Mr. Philip G. Coates, Director

Also as discussed with the members of your staff at the meeting, would you please provide us with landing information for the inshore lobster fishery at Sandwich. Information should include the aggregate number of landings and the aggregate dollar value of inshore lobster landings, for the past several years.

Your cooperation in this matter is greatly appreciated. Should you have any questions please feel free to contact me at 894-2400, extension 508. Mr. Dirk Zwart of my staff is coordinating the investigation. Should your staff desire additional information, he can be reached at extension 556.

Sincerely,

Incl
as stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copies Furnished:
Ms. Elizabeth Amaral
Division of Marine Fisheries
449 Route 6A
East Sandwich, MA 02563

cc: Coastal Dev. Br.
Reading File
Planning Div. File

SPECIES, POUNDS, AND VALUE LANDED
ALL BOATS
PORT OF SANDWICH, 1977

<u>Species</u>	<u>Pounds</u>	<u>Value</u>
Yellowtail	2,700,000	1,377,000
Sea Scollop	670,198	1,110,000
Blackback	2,275,809	780,000
Cod	1,609,578	466,000
Bluefin Tuna	382,057	414,000
Lobster	277,656	455,468
Sea Herring	5,795,011	201,000
Haddock	541,286	180,000
Fluke	288,333	173,000
Ocean Dab	239,293	79,000
Greysole	134,146	55,000
Sand Dab	229,167	55,000
Monk Tail	148,649	55,000
Squid	76,941	23,000
Pollock	123,529	21,000
Scup	48,148	13,000
Sea Bass	12,125	9,000
Whiting	38,580	4,000
Crab	16,000	4,000
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Mackerel	5,883	2,000
Cusk	5,882	1,000
Butterfish	2,702	1,000
Other	<u>5,000</u>	<u>1,000</u>
Total	15,656,763	\$5,485,468

WEDPL-C

SUBJECT: East Boat Basin, Sandwich, MA

SEP 18 1991

Commander (oan)
First Coast Guard District
150 Causeway Street
Boston, MA 02114

~~SEP 20 1982~~

1. This letter concerns our ongoing navigation study for the expansion of the East Boat Basin, located in Sandwich, Massachusetts.
2. In order to assist us in the formulation of plans, we would like to determine what your future operational requirements will be inside the East Boat Basin. Please estimate how many vessels you plan to have stationed there and the dimensions of each.
3. Also, we would like your view concerning the possibility of the U.S. Coast Guard and Corps of Engineers sharing the same berthing facility inside the basin. We are exploring the possibility of locating a berthing facility just inside the entrance, as shown on the accompanying map. Please comment on both the joint use possibility and the location feasibility. Please note that a proposed expansion project would most likely recommend removal of the fish offloading facility located in that area. Therefore, access to the berthing facility would be maintained.
4. Your cooperation in this matter is greatly appreciated. Should you have any questions, please feel free to contact me at 894-2400, extension 220. Mr. Dirk Zwart of my staff is coordinating the investigation. Should your staff desire additional information, he can be reached at extension 556.

Incl
as

C. E. EDGAR, III
Colonel, Corps of Engineers
Commanding

cc: Executive Office
Coastal Dev Br
Reading File
Planning Div File



PHILIP G. COATES
DIRECTOR

The Commonwealth of Massachusetts
Division of Marine Fisheries
Leverett Saltonstall State Office Building
100 Cambridge Street
Boston, Massachusetts 02202

727-3193

November 27, 1981

Mr. Joseph L. Ignazio
Chief, Planning Division
U.S. Army Corps of Engineers, N.E. Division
424 Trapelo Road
Waltham, MA 02254

Dear Mr. Ignazio,

My staff has reviewed your letter of September 1, 1981, requesting information relative to the proposed expansion of the Sandwich Boat Basin. Although some of your questions are rather ambitious in nature, I will answer them to the best of our ability.

The proposed expansion is consistent with our policies for port development in that it is an improvement to an existing port which presently has inadequate docking facilities. If the expansion was merely intended to increase effort in the fully utilized fisheries, or create a new fishing port, it would not be in the best interests of the Commonwealth at this time. However, it is important to note that the Sandwich fleet does not operate in a vacuum, and that these vessels are competing with the other fishing vessels operating off our coast. The addition of vessels to the Sandwich fleet will not mean a large increase in total fisheries effort since most of these vessels will be displaced from other severely overcrowded ports.

The potential for increased landings is difficult to predict given the number of variables to consider. Theoretically the total fishery resources of the Northeastern U.S. are sustainable at roughly 900,000 MT, or three times the present U.S. and foreign catch. However, many of the species currently landed at Sandwich are presently or close to being overfished. The transition to the underutilized species depends on several important changes in the industry. The development of marketing systems and processing facilities, the improvement of quality and handling techniques, the adoption of new and innovative fishing practices, and the development of new domestic markets while increasing exports

all must precede effective utilization of the non-traditional species.

Although the inexactness of fishery science and the variability of stock dynamics make long term estimates of abundance difficult, if not impossible, the following species currently offer the greatest potential for an expanded Sandwich fleet (estimated potential increase in parentheses^I): pollock (47%), silver hake (84%), red hake (86%), mackerel (99%), butterfish (86%), spiny dogfish (96%), Loligo squid (86%), Atlantic herring (62%), sand dab (unknown), and ocean pout (unknown). Prospects for silver hake, herring, and mackerel are contingent on recovery of stocks. Spiny dogfish, ocean pout, and silver hake offer the greatest potential for inshore vessels, which many of the Sandwich vessels will be.

In more general terms the potential for increased landings is considerable, given the trend toward the elimination of quota management and the abundance of the underutilized species. Marketing programs and gear technology programs are already underway, but support facilities, including processing and storage facilities are necessary to complete the picture. Consequently the development of the basin should proceed with increased utilization of these species in mind. This will require a coordinated effort between the Corps, the community, and the fishing industry.

In answer to your question on lobster landings we are able to provide data for 1979, when 124,265 lb. worth \$248,530 were landed, and 1980, when 121,869 lb. worth \$262,018 were landed. Prior to 1979 lobster landings were not recorded by individual port.

I hope this information is helpful to you in your deliberations concerning this project. If I may be of further assistance please contact me.

Very truly yours,



Philip G. Coates
Director

PGC/JF:vf

^I Calculated as percent difference between 1978 U.S. and foreign catch and projected MSY by species stock unit (McBride, M.M. and B.F. Brown, 1980. The status of the marine fisheries resources of the northeastern United States. NOAA Technical Memorandum, NMFS-5/NFC-5.)



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 102ND FIGHTER INTERCEPTOR WING
MASSACHUSETTS AIR NATIONAL GUARD
OTIS AIR NATIONAL GUARD BASE, MASSACHUSETTS 02542

REPLY TO
ATTN OF: FIW/BCE

APR 6 1982

SUBJECT: East Boat Basin, Sandwich, MA

TO: Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02254
Attn: NEDPL-C

1. Reference your letter dated 26 Mar 82, subject as above.
2. This confirms the telephone conversation between Mr. Zwart of your office and Mr. Merritt of this office to the effect that the Otis sanitary landfill is for the sole use of base occupants and cannot accept excavated and dredged material from subject project.

Philip J. McNamara
PHILIP J. McNAMARA, LtCol, MaANG
Base Civil Engineer

Readiness is our Profession

NEDPL-C

SUBJECT: East Boat Basin, Sandwich, MA

MAR 26 1982

Colonel Phil McHamara
Base Civil Engineer
Otis Air Force Base
Palmouth, MA 02542

1. This letter concerns our ongoing study for the expansion of the East Boat Basin.
2. Reference is made to the telephone conversation of 25 March 1982, that Col. Merrett of your staff had with Mr. Zwart of my staff. As discussed on the telephone we are trying to determine the feasibility of a number of sites for the disposal of dredged and excavated material that would be generated by the proposed project. Otis AFB had been identified by us as a potential disposal site earlier in the study process.
3. As stated by Col. Merrett, base policy precludes the acceptance of material from outside the base. Therefore, Otis AFB can be eliminated from further consideration as a disposal site for the subject study.
4. A response to this letter would be appreciated, including any additional comment or information. Should you have any questions, feel free to contact me at 894-2400, extension 222. Mr. Dirk Zwart of my staff is coordinating the investigation. Should your staff desire additional information, he can be reached at extension 556.

FOR THE COMMANDER:

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Deputy Commander

cc: Executive Office
Coastal Dev Br
Reading File
Planning Div File



PHILIP G. COATES
DIRECTOR

The Commonwealth of Massachusetts

Division of Marine Fisheries

Leverett Saltonstall State Office Building

100 Cambridge Street

Boston, Massachusetts 02202

727-3193

April 13, 1983

Dirk Zwart
U.S. Army Corps of Engineers
Coastal Development Rd.
Waltham, MA 02254

Dear Mr. Zwart;

This letter is in response to requests for information for determining the feasibility of Federal participation in the expansion project at the East Boat Basin, Sandwich, Ma.

Background of East Boat Basin

The basin has supported an active commercial fleet, partly described in letters dated August 25, 1980 and November 27, 1981 and in telephone conversations from this agency to the Corps of Engineers.

The basin is a convenient, centrally located, wellprotected deep-water port having ready access to fishing ground in Cape Cod Bay, Massachusetts Bay, Nantucket and Vineyard Sounds, as well as the back side of Cape Cod and Georges Bank. It should be noted that this location allows a "fair-wind" return with a lee provided by the Cape for the last part of the trip from Georges Bank around Race point or through Nantucket Sound during storms with either southeasterly or northeasterly winds. The basin and at least its northeasterly approach are usually icefree and navigable, allowing fishing operations to continue after other near-by ports have frozen to inactivity. The proximity of the Canal Electric Plant offers the potential of utilizing the heated sea water effluent of the plant by diverting all or part into the basin to insure no freeze-overs in even the harshest of winters. There is convenient access to state highways and the Interstate highway system, and there is an existing rail-road siding on an active East coast trunk.

Present East Basin Problems

There are, however, several major problems with the existing port, the most serious being overcrowding and inadequate berthing. The local fishing fleet and the number of transient and seasonal commercial and recreational vessels using the East Basin exceeds

its capacity to a point that presents dangers and debilitating inefficiencies to those vessels.

Commercial vessels of 70' or less (the basin is too small for anything larger) must tie alongside one another out from the existing small pier as many as 15 deep, often damaging one another as they maneuver into or out of this raft or merely move in the wind and swells. When rafted it is very difficult and sometimes almost impossible for any vessel not on the outside of the raft to leave, and then only with the assistance and cooperation of the crews on adjacent vessels. This is a major undertaking which may take an hour or more to accomplish and can be done only when the other vessels are manned. Thus, there are times when a skipper would like to leave the raft to fish, move, offload, take on ice, refuel, make repairs, etc. but either cannot or doesn't bother to. Through talking to fishermen regularly using the basin, I estimate that productive fishing time lost due to rafting-related problems is 20% during spring, summer, and fall. Damage to vessels resulting from rafting is variable, usually contributing more toward lost fishing time.

Rafting presents other hardships to the fishermen. Carrying gear, provisions, or anything across several other boats is difficult. Crossing unfamiliar decks cluttered with fishing gear in darkness or snow and ice is hazardous. Moving almost anything weighing more than about 100 pounds necessitates first moving the boat out of the raft.

But there is no working bulkhead in the basin where a boat can temporarily tie next to a truck for loading or offloading heavy items. There is such a bulkhead on the canal itself but this is fenced off except at the fish packing house for the offloading of fish. Whenever heavy or bulky items must be loaded or off-loaded, either the vessel must go elsewhere or the equipment be man-handled aboard, a very risky and dangerous method. Service vehicles such as welders, mechanics, carpenters, etc. cannot park next to the boat being repaired, making some tasks very difficult, if not impossible. These difficulties often result in the delay of needed maintenance and repair until failure; a dangerous, expensive, and unnecessary procrastination.

Since there is no off-loading alternative, skippers must sell their catch to and take ice from the company holding the exclusive rights to the single off-loading area. This arrangement assures that there is no effective competition for the catch, and no alternative market for the skipper. Furthermore, the skipper must stay on good terms with this company for the privilege of using that area for moving fishing gear on to or off of the boat.

Taking on ice can be done only when there is no vessel off-loading its catch, resulting in a great deal of productive fishing time lost in waiting for ice before the start of a trip. The inefficiencies due to offloading and icing costs 10 to 15% of possible fishing time in summer and contributes to a lower quality (and therefore lesser value) catch.

The one offloading and icing area is located on the canal itself, subjecting the boats to wakes created by vessels transiting the canal. Since many pleasure boats, USCG patrol boats, the Army corps patrol boat, and many freighters create large and powerful wakes, offloading (where heavy masses swing overhead) can become extremely dangerous very suddenly and without warning.

Future growth

Over crowding, inability to handle large fishing vessels, lack of working bulkhead, unloading and icing inefficiencies, and lack of alternative markets for the catch, combine to make the basin less attractive for fishermen presently operating out of other ports. Since other nearby fishing ports such as Scituate, Green Harbor, Plymouth, Provincetown, Woods Hole, and even New Bedford and Gloucester are extremely overcrowded, there is a need from the existing fleet for expanded and improved port facilities. Adequate expansion of the East Boat Basin would attract surplus vessels from these overcrowded ports, helping to alleviate their constipation.

While there will likely be little further expansion in the present groundfish, scallop, and lobster fleets, the opportunities to harvest as-yet underutilized species is real. Substantial markets for herring, mackerel, squid (both *Illex* and *Loligo*) hake (red, white and silver), butterfish, dogfish (both smooth and spiny), and ocean pout are imminent, due to aggressive fisheries development activities by National Marine Fisheries Service, Fisheries Development Foundation, and private groups. Utilization of these untapped seafood resources is important for the growth and health of our fishing industry and, through deficit in our national balance of trade, to the country as a whole.

Due to the lesser value of the underutilized resources, large amounts of these fish must be harvested, handled, and processed in order to make them economically feasible for the harvester and processor. An important but lacking prerequisite is larger and more efficient vessels, offloading systems, processing plants, and berthing-staging areas. As previously mentioned, most Massachusetts fishing ports are already overcrowded and provide for virtually no expansion in the fishing fleet. Furthermore, their facilities are generally obsolete and in need of repair. Expansion of the East Boat Basin would help alleviate overcrowding in several ports, and would provide for imminent growth in the Massachusetts and regional fishing fleet.

Sincerely,



Coordinator, Fisheries
Extension Service

JW/rr

cc: Kevin McKelvey, U.S. Army Corps



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Ecological Services
P.O. Box 1518
Concord, New Hampshire 03301

MAY 20 1982

Colonel William E. Hodgson
Deputy Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Colonel Hodgson:

This letter is to aid you in your planning for navigation improvements at East Boat Basin, Sandwich, Massachusetts. It is submitted in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). We evaluated the nine alternate plans you are considering for development of the Basin to accommodate more recreation and commercial fishing boats.

Habitat at the site proposed for expansion is characteristic of old spoil sites with relatively poor soils and sparse vegetation. The more conspicuous vegetation is phragmites, bayberry, cedar, and various grasses. There is an extensive habitat diversity because larger trees and brush are located near the railroad tracks. This helps to attract various animals such as raccoons, skunks, and rabbits. It is important for songbirds during the spring and fall migration periods and provides nesting for several species. A list of possible breeding birds is enclosed. There is little permanent or temporary water but enough to attract a few ducks at times. We have tentatively classified this site in Resource Category 3. 1/

We previously advised your staff that a Habitat Evaluation Procedure (HEP) study would be necessary to produce more detailed information on the relative value of this site and any potential mitigation site. We now believe that HEP would not be cost-effective because there is inadequate data on habitat requirements for the species found at the site and because the project is of small scale.

Selection of a site for the spoil disposal is the key to the degree of mitigation that can be achieved. We have located a number of potential sites, which, with the sites you are considering, provide an array of potential mitigation possibilities. All of the potential upland spoil sites have been visited with a representative of the Massachusetts Division of Fisheries and Wildlife. The marine site was selected in coordination with a representative of the Massachusetts Division of Marine Fisheries. All agreed that these sites are worth further study. Further coordination with local authorities will be required when the additional studies are initiated.

1/ Department of the Interior, U.S. Fish and Wildlife Service Mitigation Policy, Federal Register, January 23, 1981, pp. 7644-7663.

Only one of the three disposal sites on your list has potential for habitat mitigation. This is the "stump dump" site located at a sand and gravel pit next to the east side of Route 130 and about one mile south of the junction of Routes 130 and 6. This is essentially a commercial sand pit with no vegetation and it is partly filled with stumps. Placing the spoil here could mitigate habitat losses. The other two sites are located at Otis AFB and at the Town (Sandwich) Highway Garage. Both sites have existing forested habitat, (pitch pine, white oak, red oak) which would be destroyed by filling. The lost habitat could eventually be replaced on the spoil but this would not mitigate the loss of habitat at the Basin.

We have selected a marine disposal site where there is a possibility of creating a tidal flat or a salt marsh. The site could be located somewhere along the north-west (inland) side of Stony Point Dike on the west side of the Canal in Wareham. Detailed investigation of the existing habitat is necessary to determine the species composition and value and to locate a specific site to be filled. The relative value of the existing habitat has to be determined so that its loss can be compared with the potential gain of the new habitat. Successful creation of a salt marsh or flat will most nearly replace habitat buried by the original fill at East Boat Basin. It also would be more valuable than the existing habitat. Therefore, this site is our first choice for further investigation.

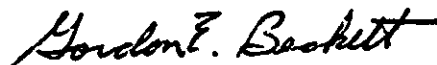
There is one additional site at a vacant gravel pit located on the Crane Wildlife Management area. Because this area is already dedicated for conservation and fish and wildlife management, it would have second priority.

Another area which could provide improved wildlife habitat, plus an opportunity for a public demonstration of habitat restoration is located on Federal land, the Canal Midway Station. Existing vegetation at this site is scattered and is poor wildlife habitat. Placing spoil at this site could mitigate the loss of habitat and provide a public educational facility. Photocopies of maps of the sites are enclosed.

We will object to any proposal for offshore deepwater disposal that does not meet the ocean disposal criteria. The chemical analysis data indicates that it should be safe to deposit at an upland site but a bio-analysis will be necessary if the spoil is dumped offshore.

We will continue our coordination with you on this project and to assist in further analysis of the potential of the spoil sites.

Sincerely yours,



Gordon E. Beckett
Supervisor

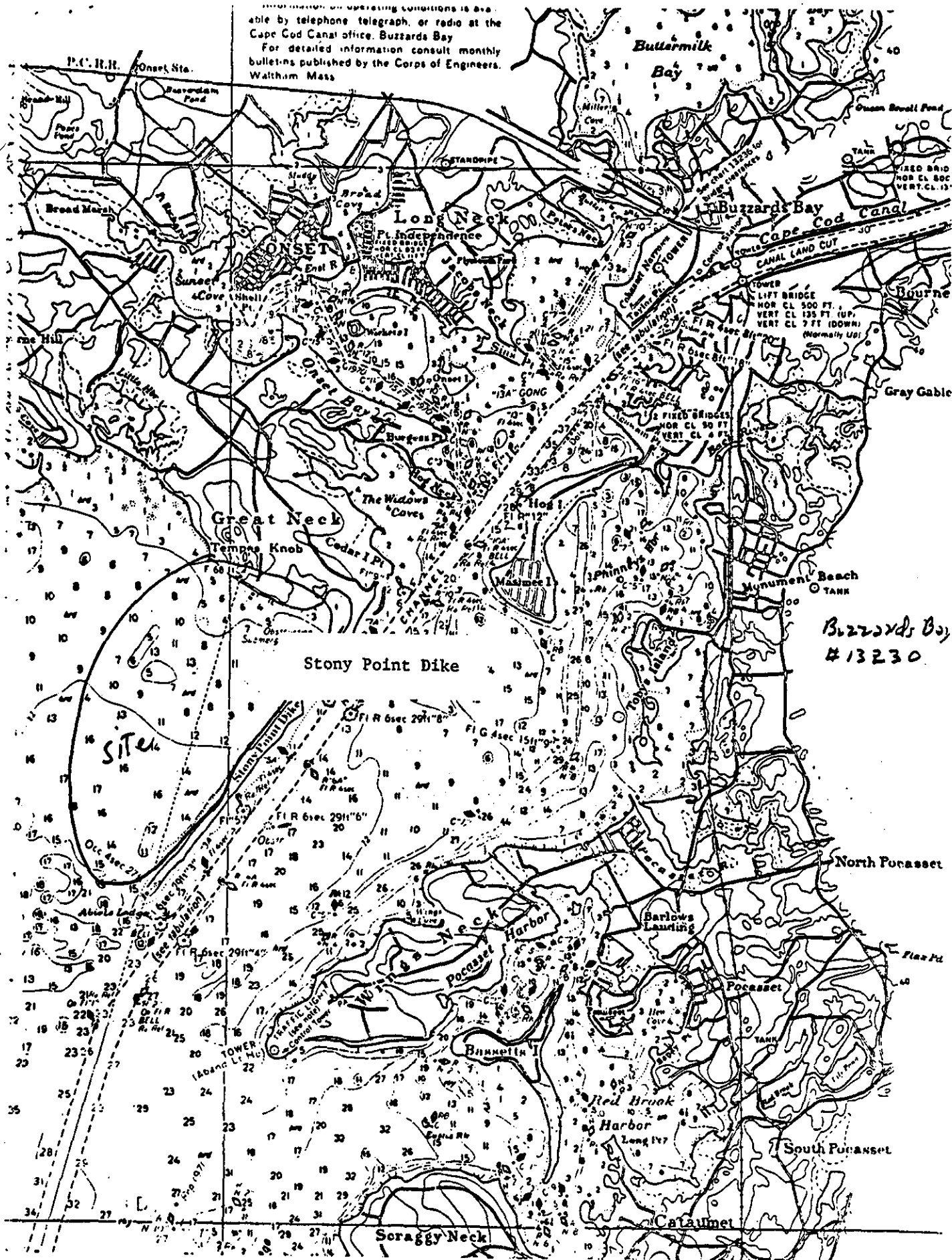
Enclosures

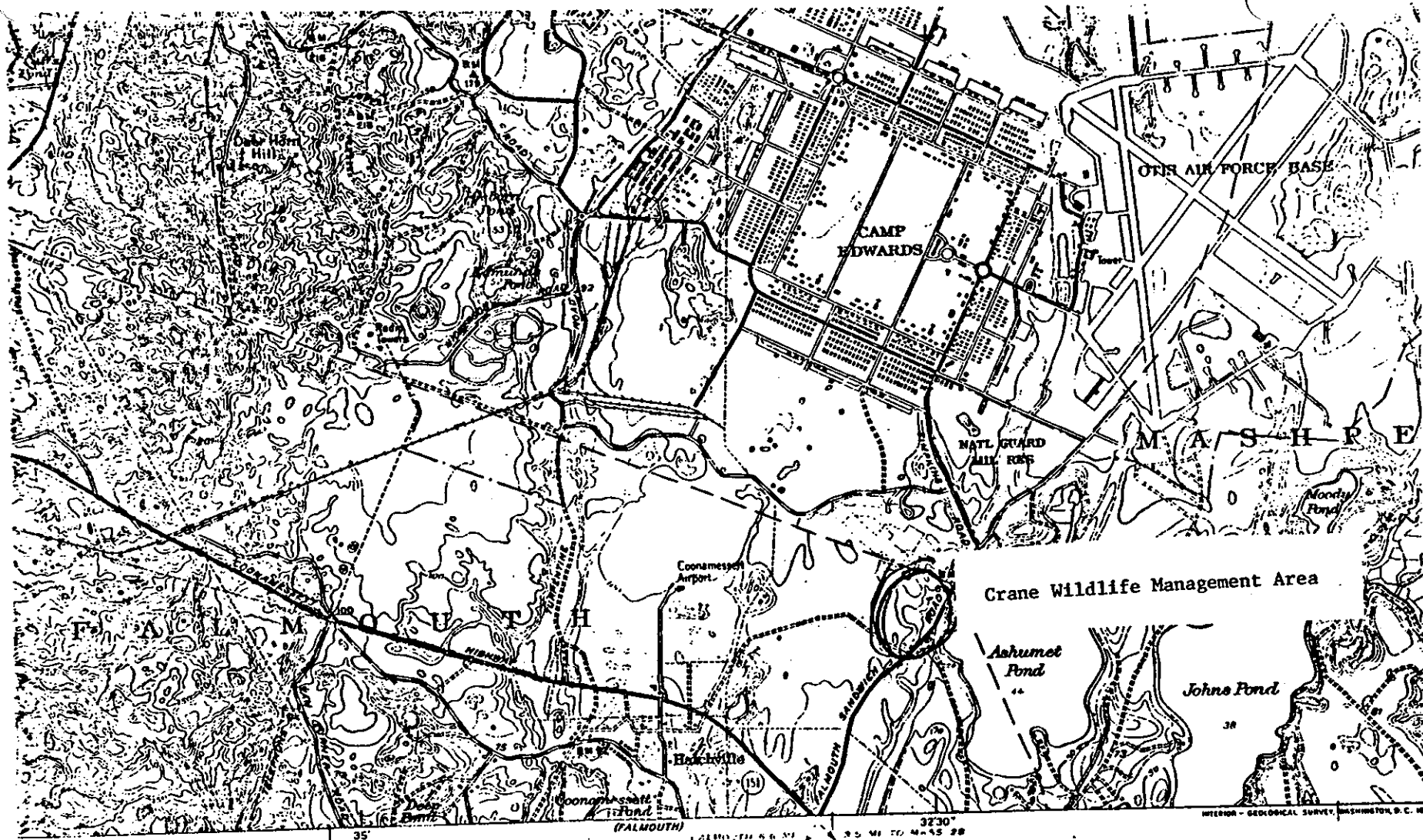
List of Possible Breeding Birds at Project Area 1/

Bobwhite
Ring-necked Pheasant
Rock Dove
Mourning Dove
Eastern Kingbird
Tree Swallow
Blue Jay
Black-capped Chickadee
Tufted Titmouse
White-breasted Nuthatch
House Wren
Mockingbird
Gray Catbird
Brown Thrasher
American Robin
Starling
Common Yellowthroat
Yellow-breasted Chat
House Sparrow
Redwinged Blackbird
Common Grackle
Brown-headed Cowbird
Cardinal
American Goldfinch
Rufous-sided Towhee
Savannah Sparrow
Chipping Sparrow
Song Sparrow
Killdeer
Eastern Meadowlark
Field Sparrow

1/ based on the Massachusetts Breeding Bird Atlas, 1974-1978, Massachusetts Audubon Society and Division of Fisheries and Wildlife.

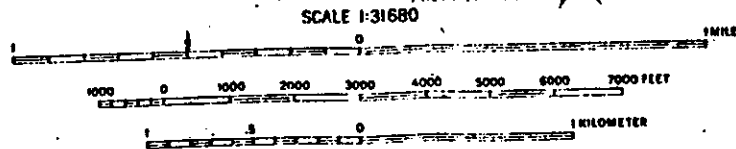
Information on operating conditions is available by telephone, telegraph, or radio at the Cape Cod Canal office, Buzzards Bay. For detailed information consult monthly bulletins published by the Corps of Engineers, Waltham, Mass.





Geological Survey
 Geodetic Survey
 1953 Revised 1953

and coordinate system



CONTOUR INTERVAL 10 FEET

DATUM IS MEAN SEA LEVEL

DEPTH CURVES AND SOUNDINGS IN FEET-DATUM IS MEAN LOW WATER
 SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
 THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 4 FEET

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS
 FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
 A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Crane Wildlife Management Area

Ashumet Pond

John's Pond

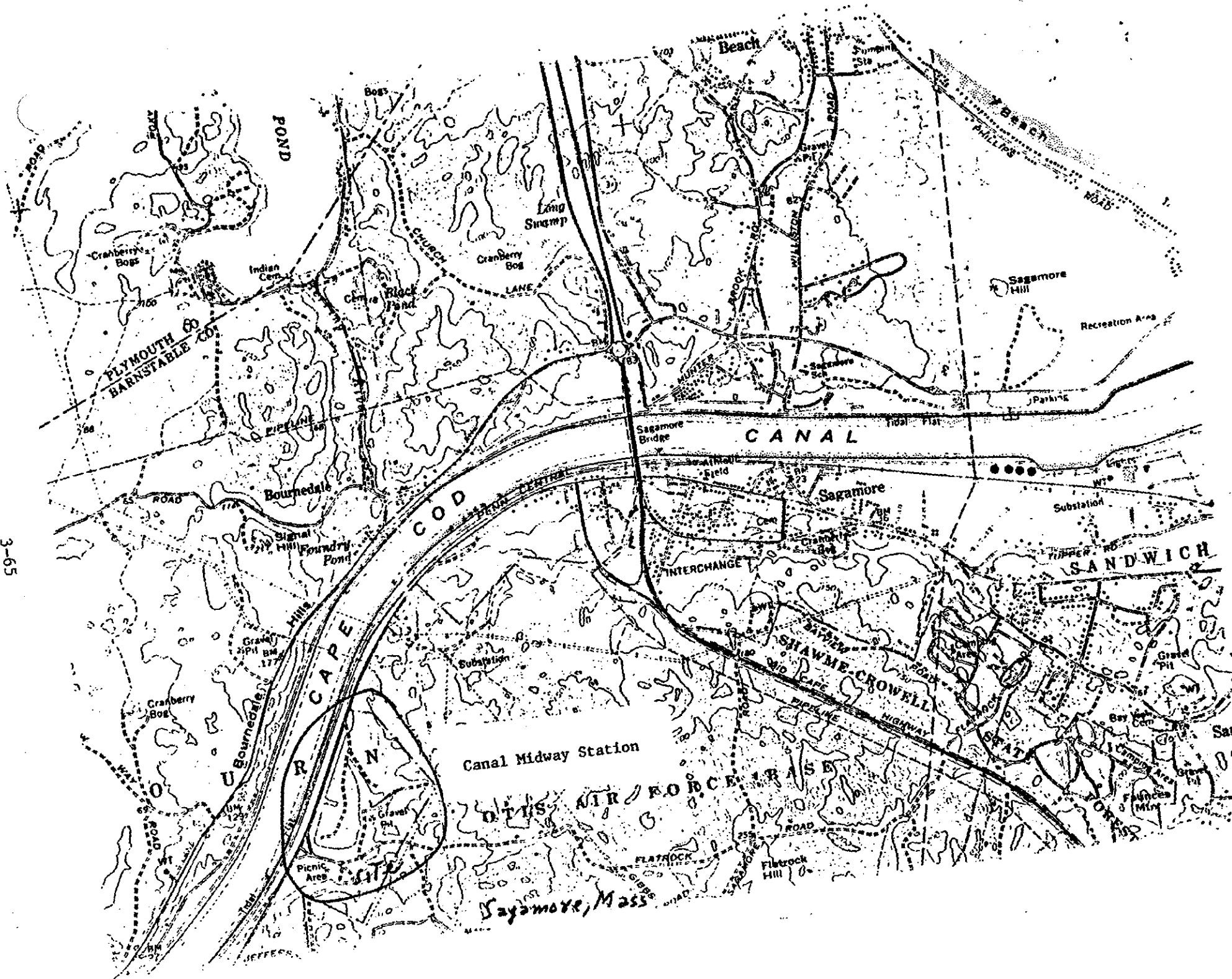
INTERIOR - GEOLOGICAL SURVEY, WASHINGTON, D. C. 20

ROAD CLASSIFICATION

Heavy-duty... Improved
 Medium-duty... Unimproved
 U. S. Route State R



POCASS!
 194137.5-



TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



P.O. BOX 660
SANDWICH, MASSACHUSETTS 02563
TELEPHONE 888-0187

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

July 19, 1982

Corps of Engineers
Postal Development Branch
424 Trapelo Road
Waltham, MA 02254
Attn: Dirk Zwart

Dear Mr. Zwart,

As you had requested of us at our last meeting, the Board of Selectmen has selected four Marina plans from the total eight plans you originally submitted to us.

We understand that the perimeter configurations and other variables of the four preferred selections remain flexible and subject to change throughout the planning process.

With the help of our Harbormaster, Mr. Ed Moffitt and the Chairman of our Marina Committee, Mr. Don Cianciolo, we have chosen the Plans B, D, E and F as submitted to us most recently in your "East Boat Basin Study".

We look forward to hearing from you as we enter into Phase III of the Marina Project.

Very truly yours,

BOARD OF SELECTMEN


Joan M. Russell

JMR/jb

NEHPL-C

Mr. Allen Peterson, Regional Director
National Marine Fisheries Service
Northeast Region
14 Elm Street
Gloucester, Massachusetts 01930

AUG 04 1982

Dear Mr. Peterson:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin located in Sandwich, Massachusetts. Reference is made to our letter of 19 August 1981 concerning the same subject.

We are presently completing intermediate level studies and are initiating the final stage of the study. Study findings to date indicate that expansion of the East Boat Basin is economically feasible, which is based largely on projected new fish landings. These projections were based on information obtained from your office and other knowledgeable sources.

During the development of the final study stage, we will require refinements to those projections utilized in our recent studies. Therefore, we are requesting your assistance concerning the projected future activities of an expanded East Boat Basin. To assist you in your efforts, a detailed description of the maximum projected project condition has been inclosed for your use.

We request that you examine the projected maximum condition and provide us with an assessment of the ability of the marine resource to sustain landings of this magnitude in the foreseeable future. If you determine that the projected landings cannot be achieved, please provide us with the level of resource that could be sustained.

Development of these resource projections is critical to our selection of the optimal project dimensions. However, responsiveness to the town of Sandwich is also of paramount importance, and it is therefore requested that your response be provided by 30 September 1982. Should no response be forthcoming by that time, this office will assume the previously developed projections are valid.

Mr. Zwart/jm/553

NEDPL-C

Mr. Allen Peterson, Regional Director

Your cooperation in this matter is greatly appreciated. Should you have any questions, please feel free to contact me at (617) 647-8220. Mr. Dirk Zwart of my staff is coordinating the investigation. Should your staff desire additional information, he can be reached at (617) 647-8353.

Sincerely,

1 Incl
As Stated

ARTHUR N. RAPPAPORT
Lt. Colonel, Corps of Engineers
Acting Division Engineer

cc: Executive Office
Coastal Dev. Branch
Reading File
Planning Div. File

PROJECTED MAXIMUM FUTURE CONDITION

I. Projected Growth of the Sandwich Fishing Industry

Projected new growth of the Sandwich fishing industry resulting from the with-project condition includes major increases in the surf clam/ocean quahog and non-traditional fisheries, with a small increase in the traditional ground fishery. Approximately half of the additional commercial fishing vessels expected to homeport at Sandwich will be transfer vessels. The charter fishing industry is also expected to develop at the basin, since it is nearer and more accessible to population centers than other Cape Cod ports.

The future Sandwich fishing fleet is expected to remain mostly an inshore fleet, which is characteristic of the existing fleet. Types and sizes of the vessels are projected to be surf clam/ocean quahog boats 50 to 60 feet in length, and non-traditional species vessels 75 to 80 feet in length. The bulk of the transfer vessels are expected to be 70 to 90 foot long groundfish vessels, and new charter boats would range from 40 to 50 feet in length.

A number of alternative plans of various sizes are under consideration, and each of them limits growth of the future fleet due to physical constraints. The projected future conditions for the largest alternative is presented below. The remaining plans would have fewer boats, but with a similar proportion of each class. Growth of new vessels is expected to occur over a period of 10 years, with transfer vessels joining the fleet immediately.

II. Projected Maximum Number of Additional Vessels

<u>Class</u>	<u>Number</u>	<u>Approximate Percentage</u>
Transfer vessels	19	40%
New vessels		
Surf clam/ocean quahog	10	20%
Groundfish	5	10%
Non-traditional	5	10%
Charter boats	9	20%
Total additional vessels	48	100%

III. Annual Landing Projection Parameters

A. Surf clam/ocean quahog vessels.

1. Fish 240 days per year.
2. One (1) landing per fishing day.
3. Three thousand (3,000) pounds per landing.

B. Groundfish vessels.

1. Fish 35 weeks per year.
2. Two (2) landings per week.
3. Four thousand (4,000) pounds per landing.

C. Non-traditional vessels.

1. Fish 40 weeks per year.
2. One (1) landing per week.
3. Seventy-five thousand (75,000) pounds per landing.

IV. Maximum Projected New Landings

A. Surf clams/ocean quahogs.

10 boats x 240 days/year x 1 landing/day
x 3,000 pounds/landing = 7,200,000 pounds

B. Groundfish.

5 boats x 35 weeks/year x 2 landings/week
x 4,000 pounds/landing = 1,400,000 pounds

C. Non-traditional species.

5 boats x 40 weeks/year x 1 landing/week
x 7,500 pounds/landing = 15,000,000 pounds

Total annual new landings = 23,600,000 pounds

V. Projected Total Annual Landings at Sandwich

<u>Year</u>	<u>Landings (pounds)</u>
1975	6,400,000
1976	11,800,000
1977	15,300,000
1978	19,000,000
1979*	19,100,000
1980*	<u>14,800,000</u>
	14,400,000 Average annual existing landings
	<u>23,600,000 Projected maximum new landings</u>
	38,000,000 Total future maximum landings

Sources: Commonwealth of Massachusetts, Division of Marine Fisheries

*National Marine Fisheries Service, Northeast Fisheries Center,
Resource Statistics Office, March 1982

In addition to present Sandwich landings and projected new landings attributable to new Sandwich boats, it is expected that from 5 to 10 million pounds of groundfish will be landed annually at Sandwich by transfer vessels. These would be existing landings that are normally landed at other ports and would therefore not further impact the available fishery resource.

WELPL-C

AUG 10 1982

Ms. Harriet Diamond
Executive Office of
Environmental Affairs
Coastal Zone Management
100 Cambridge Street
Boston, MA 02202

Dear Ms. Diamond:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts.

We are presently completing intermediate level studies (development of alternative plans) and are initiating the final stage of the study. The final study effort will evaluate four alternative plans of improvement, all of which propose a landcut to expand basin dimensions. A brief description of the proposed alternatives is inclosed.

Environmental studies performed to date have included physical and chemical testing of the material to be disposed of, and the identification of alternative disposal sites. The results of the aforementioned are inclosed for your use.

Based on the test results the material appears to be suitable for both ocean and upland sites. Although an upland site is presently preferred, we feel that all options open to us should remain so. We are therefore requesting assistance in selecting those sites which your office deems acceptable.

Your cooperation in this matter is greatly appreciated. Should you have any questions feel free to contact me at (617) 647-8508. Mr. Dirk Zwart of my staff is coordinating the investigation, with Mr. Joseph Horowitz handling the environmental aspects. Should your staff desire additional information, Mr. Zwart can be reached at (617) 647-8553 and Mr. Horowitz can be reached at (617) 647-8518.

Sincerely, .

Incl
As stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:
Mr. Jack Clark
Cape Cod Planning &
Economic Development Commission

cc. Coastal Dev. Br.
Mr. Zwart ✓
Mr. Horowitz
Reading File
Planning Div. Files

MAILING LIST

Ms. Harriet Diamond
Executive Office of Environmental Affairs
Coastal Zone Management
100 Cambridge Street
Boston, MA 02202

C.F.: Mr. Jack Clark
Cape Cod Planning and Economic
Development Commission
1st District Court
Barnstable, MA. 02630

Mr. Bob Stevens
Department of Environmental Quality Engineering
Wetlands Protection Division
Lakeville Hospital
Lakeville, MA 02346

Mr. Peter Holmes
Environmental Protection Agency, Region 1
JFK Federal Building, Room 2103
Boston, MA 02203

Mr. Tom McMahon
Department of Environmental Quality Engineering
Division of Water Pollution Control
1 Winter Street
Boston, MA 02110

Mr. Chris Mantzaris
National Marine Fisheries Service
7 Pleasant Street
Gloucester, MA 01930



ANTHONY D. CORTESE, Sc. D.
Commissioner

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
Division of Water Pollution Control
One Winter Street, Boston 02108

October 13, 1982

Joseph L. Ignazio, Chief
Planning Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Re: Navigation Study
East Boat Basin
Sandwich

Dear Mr. Ignazio:

This letter concerns this Division's review of the environmental study performed for the expansion of the East Boat Basin in Sandwich. These studies have involved characterization of material to be dredged and excavated from the development site as well as an identification of potentially available disposal sites.


From the information enclosed with your August 10, 1982 letter, it is apparent that the material to be removed from the project site can be classified, for the most part, as a Category One, Type A material. As identified by our regulations pertaining to disposal of material into waters of the Commonwealth (314 C.M.R. 9.00), this material is approvable for placement at the sites mentioned in your assessment. A site that may not normally be approved would be an open ocean site characterized as having low energy dynamics and naturally occurring silty bottoms. None of the sites listed in your reports fall into this prohibitive category.

However, we would like to see the excavated material be put to beneficial use, rather than being merely disposed. A site that could certainly use the material is Sandwich Town Beach. Accelerated erosion has occurred at the the Town Beach due to the construction of the Cape Cod Canal jetties. The sand transport system has been disrupted by these jetties, resulting in a build-up of beach area at Scusset Beach at the expense of Sandwich Town Beach. While the erosion problem will not end as a result of the placement of the East Boat Basin Project material, it would retard the accelerated loss of beach frontage from the beach by littoral currents and would likely be a source of sand for areas down drift of this site.

We would also appreciate being notified of plans for the handling and disposal of sewage from the service facilities. Permits for discharge of sewage or for construction of public rest rooms facilities may be required.

Please keep this Division informed of the progress of this project. Any questions relating to our comments should be directed to Richard Tomczyk at 292-5672.

Very truly yours,


Thomas C. McMahon
Director

TCM/RT/wp



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J. F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

October 22, 1982

Joseph L. Ignazio
Chief, Planning Division
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Dear Mr. Ignazio:

This letter concerns our review of the on-going navigation study for expansion of the "East Boat Basin" in Sandwich, Massachusetts by the Army Corps of Engineers.

Based on the physical and chemical testing data of the material to be dredged, we find the dredged material for any of the proposed four alternative plans of basin improvement (A,B,C,D) to be acceptable for either ocean or upland disposal.

The alternatives which warrant further investigation are alternatives number 3, 5, and 6, or a combined use of them. Each of these three alternative sites (3,5,6) could accommodate the dredged material with short-term limited environmental effects. Alternative #6 should particularly be investigated because of the benefits that could be derived from the creation of a tidal saltmarsh. This alternative would provide mitigation for some of the habitat loss from dredging and proposed placement of riprap revetment.

Finally, on the proposed vessel alignment within the basin, it would be most advantageous to put the commercial vessels nearest to the canal entrance. These vessels would be using the facility daily while recreational boats would use it only seasonally.

Thank you for the opportunity to comment on this on-going navigation improvement study, and please keep us informed of its progress by contacting Mr. Melvin Holmes at 223-5061.

Sincerely

Clyde F. Shufelt

Clyde F. Shufelt, Chief
Municipal Permits Section
Water Quality Branch

cc: USFWS, Concord, NH
NMFS, Gloucester, MA
MACAM, Boston, MA



COASTAL ZONE
MANAGEMENT

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

November 5, 1982

Mr. Joseph L. Ignazio
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Mr. Ignazio:

This letter is written in response to the Corp's request for comments regarding the East Boat Basin Expansion Navigation Study. That project involves the excavation of land owned by the Town of Sandwich and dredging for the enlargement of the existing harbor. The additional space created by this expansion will be used to increase dockage space for commercial fishing boats and support facilities for the fishing industry. You have requested comments regarding the configuration and design of the harbor as well as the site options for disposal of the dredged and excavated material. Our comments on the proposed plans for the harbor expansion are as follows:

Preferred Design Alternatives

The project feasibility report, which was funded by the Massachusetts Coastal Zone Management Office and compiled by Tibbetts Engineering, supports plans which would separate commercial and recreational vessel berthing areas within the East Boat Basin. According to the report, "recreational boats would find it an advantage to be removed from the boating traffic created by the commercial boats". Corps plans A and C which recommend that recreational and commercial activities be separated into the east and west ends of the Basin would satisfy the needs of both user groups. The East Boat Basin freezes during the winter, with the east portion of the basin freezing earlier in the year than the west portion (entrance). Since recreational boating activities are at a minimum at that time and commercial activities are still at a high level it makes sense that recreational activities should be in the eastern portion of the basin and the commercial vessel activity should be located in the western portion of the basin as close to the entrance to the Cape Cod Canal as is feasible. The design alternative proposed by plans A and C seem to achieve two things: (1) reduce traffic conflicts between recreational and commercial vessels and (2) facilitate commercial vessel access to open water during the winter months.

However, of the two plans cited above, the Office of Coastal Zone Management supports the utilization of Design Plan C because it creates larger areas for both commercial and recreational vessels to maneuver and anchor than does Plan A. The project benefit/cost ratio would probably increase with the utilization of the larger plan because the expanding fishing industry on Cape Cod would have little problem fully utilizing the new area.

Disposal Alternatives

Policy 5 of the Massachusetts Coastal Zone Management Program states that:

"On-land disposal of dredged material should be favored over ocean dumping, if appropriate sites are available, adverse environmental impacts such as degradation of groundwater can be minimized, and costs are feasible."

Two of the upland, in-harbor disposal site alternatives identified by the Corps appear to be viable options and should be examined in more detail. They are: (1) marsh creation at Stony Point dike in Wareham, and (2) disposal at Camp Edwards Military Reservation. Marsh creation is CZM's preferred priority for the disposal of the sediments. As stated in the May 20, 1982 letter of the U.S. Fish and Wildlife Service, this option would replace habitat that was buried by the original filling at Stony Point. Marsh creation would also greatly increase the project's environmental benefit/environmental cost ratio. In addition, this would be an excellent chance to utilize this method of disposal in the Commonwealth and thereby increase the chances of it being utilized in other dredging projects in the state. Upland disposal at the military site, appears to have little environmental benefit, but also minimal environmental impacts, and it should be evaluated further.

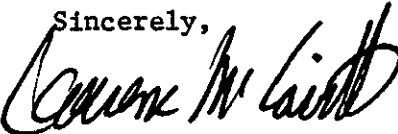
The other upland alternatives presented are not considered viable options because they would either result in a negative environmental impact at the disposal site (i.e., filling the steep bowl-like depression near the landfill; placing gravel or fine grained material on the Sandwich Town Beach) or they would preclude a previously existing use (i.e., use of the Crane Wildlife Management Area Land which is dedicated for wildlife conservation use; or use of the Corps of Engineers Gravel Pit which could not be mined after dredged material disposal).

Ocean disposal of the material at the Boston Foul Area is a potential alternative if the dredged and excavated material is judged "acceptable for ocean disposal" based on bioassay/bioaccumulation testing. Disposal in Cape Cod Bay is not a likely alternative at the present time because the state MEPA Office has required that an Environmental Impact Report be prepared and a disposal site formally designated before material other than the Wellfleet dredge sediments may be disposed of in the Bay. This would be a costly, time consuming process and one not likely to occur by the time the East Boat Basin expansion is constructed.

Mr. Joseph L. Ignazio
November 5, 1982
Page 3

Finally, it should be noted that the Town Selectmen of Sandwich have notified our office of the Corp's proposal to sell the federal portion of the East Boat Basin to the town. Should this purchase occur, planning considerations for the harbor and its expansion will likely change. At that time, MCZM will offer updated planning comments which will reflect these changes. For further correspondence on this project, please call myself or Harriet Diamond of my staff.

Sincerely,



Richard F. Delaney
for Director

RFD:HD:bam



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Services Division
Habitat Protection Branch
7 Pleasant Street
Gloucester, MA 01930

December 14, 1982

Mr. Joseph Ignazio
Planning Division
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Dear Mr. Ignazio:

This is in regard to the ongoing navigation study for the expansion of the East Boat Basin in Sandwich, Massachusetts.

The National Marine Fisheries Service (NMFS) has reviewed the four alternative plans for improvement, (A, B, C, D) and determined that any of the proposed alternatives are acceptable. Each alternative will involve expansion of the existing boat basin and creation of additional aquatic access for the public by excavating upland.

The material in question is poorly sorted containing particle sizes ranging from coarse gravel to silt and clay, with approximately 25% being the silt and clay fraction. Disposal of this material would increase water column turbidity in the vicinity of the dumpsite. If disposal occurred at an inshore area such as a site in Buzzards Bay, the increased turbidity could negatively impact inshore fishery resources by smothering planktonic larvae, and fouling gills of finfish, lobsters, and other invertebrates. In addition the disposal mound created by the approximately 1,000,000 cubic yards of material probably would be spread out by storm activity, thereby increasing impacts to nearby fishery resources by burial of habitat.

We recommend upland disposal alternatives be sought. We suggest that disposal alternatives 1, 3, 4 be investigated further. In addition, other municipal sanitary landfills, private individuals, or local businesses in the vicinity of the project may be able to use some or all of the excavated material. If all the excavated material could not be used immediately, perhaps a suitable location could be found to stockpile the material for future use.

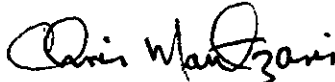
Should upland disposal be impractical, impacts to sensitive fisheries could be reduced if disposal occurred further offshore. Open ocean disposal at authorized dumpsite would be preferable to near-shore disposal. In fact, disposal of this material at the Boston Foul dumpsite may be desirable since it would form a "defacto" cap on top of more polluted, previously dumped dredged material.



To summarize, while the material proposed for excavation would be free of contaminants and be suitable for aquatic disposal, the physical impact from disposal operations on fishery resources could be significant. We recommend an upland disposal alternative be sought.

Please direct questions or comments regarding this project to Mr. Gene Crouch (FTS 837-9317) of my staff.

Sincerely,


for Ruth Rehfus
Branch Chief



ANTHONY D. CORTESE Sc. D
Commissioner

PAUL T. ANDERSON
Regional Environmental Engineer

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs Department of Environmental Quality Engineering Southeast Region

*Lakeville Hospital, Lakeville, Massachusetts 02346
947-1231, EXT. 680-684*

January 10, 1983

Mr. Joseph Horowitz
Department of the Army
New England Division, C.O.E.
424 Trapelo Road
Waltham, Massachusetts 02254

RE: SANDWICH--NEDPL-C, East Boat Basin

Dear Mr. Horowitz:

As a follow-up to your telephone conversation with Robert Stevens, of the Wetlands Protection staff, we would like to make the following comments on the various options under consideration for the East Boat Basin project. These comments result from project review by members of our Solid Waste and Wetlands Protection staff.

The disposal of marine dredged material presents the major problem to be resolved for the East Boat Basin project. The disposal alternatives are evaluated below in order of acceptability and preferability based on environmental considerations. We have used your numbering and site location descriptions for identification purposes.

#8 C.O.E. - Gravel Pit at the Canal Midway Station - This is the best upland site from a purely environmental perspective because of the proximity of the canal and the local groundwater table gradient. Any chlorides that would be leached out of the marine dredge material would flow directly into the canal, with no possibility of water supply contamination. This site characteristic might also allow recycling of the old fill material which will now be removed to enlarge the basin. If sufficient area is available, then the re-excavated fill could be stockpiled (for several months or longer), to allow rain water to leach out the salts.

#1. Existing Sandwich Sanitary Landfill

#2. Depression to the North of the Sandwich Sanitary Landfill - These sites are both good potential disposal sites. The landfill may be able to handle considerable volumes of material. Due to their location, chloride contamination of public water supplies is not of concern for these sites.

#5. Sandwich Town Beach on the South side of the Cape Cod Canal - If material of compatible grain size distribution is available, then this beach nourishment option should be given highest priority. However, from the data presently available, the sediments may not be appropriate in grain size distribution. Only sample A appears to be even close to compatible and the silt and clay is at a maximum (approximately 16%) for beach nourishment. The high gravel content (approximately 20%) may not be

desirable for recreational purposes. The remaining samples reported show far too much silt and clay to be used for beach nourishment, despite being chemically clean. Additional sampling and size analyses will be needed to properly determine if this option is feasible and, if so, to clearly delineate the extent of appropriate material.

#6. Along the Inland Side of Stony Point Dike in Wareham - This option may be an acceptable alternative, but would require specific approval from the Division of Marine Fisheries before the Department would support it. The implementation of this option must result in beneficial habitat creation to warrant serious consideration.

#3. Valley Along the Eastern Border of Camp Edwards

#4. Stump Dump off Route 130, South of the Sandwich Sanitary Landfill - In our opinion, these two sites are questionable at best. They may be upgradient of the town's gravel packed well and would require considerable additional testing and research to be shown to be sound alternatives. They represent borderline cases of inland disposal sites for marine sediments.

#7. Gravel Pit on the Crane Wildlife Management Area - This site is inappropriate for disposal of marine sediments. It is too far inland and is too close to Ashumet Pond and its associated watershed. The potential for chloride contamination of this fresh water system and nearby wells should eliminate this site from further consideration.

#9. Disposal in '404' Waters - This disposal option may be appropriate, but selection of a specific site and additional testing of the sediments will be required to allow evaluation.

#10. Ocean Disposal - Due to the cost factor imposed by the distance to the Massachusetts Bay Foul Area from Sandwich, this option is probably not feasible. As indicated by you, additional testing would be necessary to complete an environmental review.

With regard to the four basin configuration plans under consideration, the issue of dredge material disposal is the major factor influencing any preference based on environmental concerns. Plan A involves the smallest volume of dredged material (and total volume) and therefore presents the smallest disposal problem of the four options. For this reason, the order of preference for basin plans is A, C, B and D. From a navigational perspective, Plans A and C appear to minimize the potential for mixing of commercial and recreational boat traffic.

Thank you for this opportunity to comment on this project during the planning stages. We hope that our comments will prove helpful in your decision making for the East Boat Basin Project. If you have any questions, please feel free to contact Mr. Robert Stevens at 727-1440, ext. 680.

Very truly yours,

For the Commissioner



Paul T. Anderson, P.E.
Regional Environmental Engineer

Mr. Zwart

Mr. Zwart/553/cer

NEDPL-C

20 January 1983

SUBJECT: East Boat Basin Study

Commander, Camp Edwards
DFAE
Camp Edwards, MA 02542

1. This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts. Reference is made to the telephone conversation between Major Stockhouse of your staff and Mr. Zwart of this office regarding potential disposal of project material at Camp Edwards.
2. As per the conversation with Major Stockhouse, disposal of the project material at Camp Edwards may be possible. The amount of material generated by the project would be about 500,000 to 600,000 cubic yards, with potential for 1,000,000 cubic yards if local development material is included.
3. It is requested that you provide a response to this letter concerning the possibility of disposing project material at Camp Edwards. A subsurface exploration plan map and gradation curves are attached for your information. Also attached is a map showing the tentatively identified Camp Edwards disposal site.
4. Should you have any questions, feel free to call me at (617) 647-8220. Mr. Dirk Zwart of my staff is coordinating the investigation and can be reached at (617) 647-8553.

Incls
As stated

CARL B. SCIPLE
Colonel, Corps of Engineers
Commander-176

Copy furnished:
CDB (2)
Reading File
Plng. Div. Files

Mr. Zwart

Mr. Zwart/553/cer

February 4, 1983

Planning Division
Coastal Development Branch

Board of Selectmen
Town Offices
Wareham, MA 02571

Gentlemen:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts.

We are presently investigating the viability of alternative disposal sites for the proposed project. The U. S. Fish and Wildlife Service has identified the area behind Stony Point Dike as a potential site for marsh creation using project material. In addition, comments received from the Environmental Protection Agency, the Massachusetts Coastal Zone Management Office and the Division of Wetlands Protection of the Massachusetts Department of Environmental Quality Engineering, indicate that this disposal alternative is highly desirable from the environmental point of view.

Approximately 500,000 to 1,000,000 cubic yards of clean material would be placed somewhere behind the dike. A map with one possible location is attached for your information.

Your comments concerning this disposal alternative are requested. If at all possible, a timely response would be appreciated so that we can incorporate your views as early as possible in the disposal site selection process.

Your cooperation in this matter is greatly appreciated. Should you have any questions, feel free to contact me at (617) 647-8508. Mr. Dirk Zwart of my staff is coordinating the investigation and can be reached at (617) 647-8553 for additional information.

Sincerely,

Joseph L. Ignazio
Chief, Planning Division

Attachment

Copy Furnished:
✓ CDB (2)
Plng. Div. Files

Boston University

Center for International Relations
152 Bay State Road
Boston, Massachusetts 02215
617/353-9278



Great Neck Road
Wareham, MA 02571

February 24, 1983

Wareham Board of Selectmen
Town Hall
Wareham, Massachusetts 02571

Dear Selectmen:

I write to oppose and protest the proposal of the Army Corps of Engineers to dispose of material "somewhere behind the Stony Point Dike" to facilitate the expansion of the East Boat Basin in Sandwich. I protest as a life-long summer resident (66 years) of Wareham on Great Neck and as a taxpayer since 1952 (31 years).

The disposal of the fill will add to the already serious silting problem behind the dike which already affects adversely all the residents, year-round and summer, on Great Neck between Tempes Knob and the Stony Point Dike. This area is suitable for recreational sailing, swimming and fishing and commercial shell-fishing. These usages will be harmed by the proposed fill to create a marsh. There is plenty of marshland already in the area of the dike.

Sincerely yours,

Daniel S. Cheever
Associate Director

DSC:cc

cc: Mr. Alexander Whiteside
Mr. Charles E. Cheever
Mr. D. S. Cheever, Jr.
Mr. Joseph L. Ignazi
Ms. Judith Montminy
Mr. & Mrs. Colin Canham

RICHARD BANCROFT
WILLIAM B. SLEIGH, JR.
HOWARD S. WHITESIDE
ALLAN R. ROSENBERG
JOHN G. VAN DUSEN
ALEXANDER WHITESIDE

Putnam, Bell & Russell

Attorneys at Law
131 State Street
Boston, Massachusetts 02109-3392
(617) 723-3131

February 24, 1983

Board of Selectmen
Town Hall
Wareham, Mass. 02571

Re: Stony Point Dike

Dear Sirs/Madam:

I own a house and land at the base of the Stony Point Dike on Great Neck. I was born in this house at a time before the dike was built. After its construction in the 1930s, the dike began to spread and also to trap sand driven to shore by the Southwest wind. The result has been a very severe silting problem in our part of the bay extending all the way to the Wareham River. The cove in front of my house now becomes so shallow at low tide that there is barely enough water to swim in. It seems inevitable that if the Corps of Engineers dumps 500,000 to 1,000,000 cubic yards of dredged material in this area, the cove will disappear for all intents and purposes and areas such as Little Harbor and Bourne's Cove will suffer accelerated accretion.

I am writing to urge your opposition to what seems to be totally unnecessary damage to a fairly large part of the town's waterfront. Clearly, no more fill is needed in this area. Many other sections of Massachusetts waterfront, which are suffering severe erosion, would seem to be much more suitable areas for the Corps to dump its dredgings. Indeed, our area of Buzzards Bay should itself be dredged to remove the silting caused by the construction of the dike.

I can see no benefit to the town by compounding what is already a serious problem on a long stretch of the town's shoreline. I also think that trucking the material on Great Neck Road and on the narrow dirt road from the Sacred Heart Seminary to the dike will not only damage the roads but also will endanger the people and animals in the area. The Selectmen should vote that this unwanted fill be kept out of Wareham's water.

Sincerely yours,

Howard S. Whiteside
Howard S. Whiteside

HSW/r
✓cc: Joseph L. Ignazio
Chief, Planning Division, U.S. Army Corps of Engineers

February 25, 1983

To the Selectmen
Town of Wareham
Massachusetts 02571

Dear Sirs:

Over sixty years ago, after his return from W.W.I, and after giving the question much deliberation, my father, General John H. Sherburne of Brookline, bought our Wareham house. This is an 1880 type, on the shore between Tempe's Knob and Little Harbor. Four generations of us have summered there very happily, enjoying the temperature of the water, the southwest wind that usually blows up the Bay in the afternoon, the sailing, fishing, swimming, windsurfing, and all the other pleasures of that beautiful area.

Many people live on that shore, and come to use it - - some for longer than we have.

We are concerned to read of the Corps of Engineers' thought of dumping half a million to a million cubic yards of fill, trucked in all the way from Sandwich, and placing it behind the dike. The access roads are tiny and rough. And there is much worry lest there be more silting at the head of the beautiful Bay.

We hope that your Board will not act favorably on this idea - surely there are many places, much nearer to Sandwich, which could use this clean fill to advantage.

Sincerely yours,

Alice Sherburne Reidy

Alice Sherburne Reidy

John A. Reidy

John A. Reidy

Owner

John Sherburne Reidy

Owner

Sherburne Reidy Worthen

✓ Copy to Mr. Ignazio

n.y.
Minn.
nasota

Daniel S. Cheever, Jr.
8 Cedar Rd.
Lincoln, MA 01773

February 28, 1983

Board of Selectmen
Wareham Town Hall
54 Marion Road
Wareham, Massachusetts 02571

Dear Members of the Board of Selectmen:

I own property off Great Neck Road (lot 1000D) in Wareham and will be establishing my legal residence there in July. I am writing to express my serious objection to the U. S. Army Corps of Engineers' proposal to fill an area behind Stony Point Dike with 500,000 to 1,000,000 cubic yards of fill from the East Boat Basin in Sandwich. As the Town's elected leaders, I hope you will consider these objections as you prepare your response to the Corps of Engineers.

I have several concerns about this proposal. First, I gather the location has been chosen because of its potential as a site for marsh development. Frankly I'm skeptical of the likelihood of a marsh ever developing along the dike. The prevailing tidal flow to the west -- which has already led to the filling in of the upper portion of the bay since the dike was first built -- coupled with the wave action from the prevailing southwest wind makes it highly likely that the fill will simply erode to the northern end of the bay. A marsh might develop along the northern shore in fifty years, but in the interim there will be an awful mess.

Second, the trucking and dumping of such a staggering amount of fill will do significant damage to existing wildlife and marine habitats. As you know, the dike itself is the breeding and nesting ground for many species of birds, and valuable shellfish beds have been established in the waters along the northwestern shore of the dike. A convoy of enormous trucks dumping 500,000 to 1,000,000 cubic yards of fill will do serious environmental damage to a lovely, valuable area.

Third, that convoy of trucks will also do some damage to all of Great Neck Road and the related approaches to the dike. The trucks will pose a traffic hazard on a narrow, winding road which scarcely can accommodate the normal traffic to and from the many homes in the area. As you know, Great Neck Road is a long road, with many clusters of dwellings in neighborhoods off its side roads. There are a great many children along the route, as well as joggers, bicyclers, and families walking along the road due to the absence of sidewalks or a suitable road shoulder. The potential for serious accidents is high, not to mention the expenses likely to accrue to the Town for traffic control, signs, road repairs, and potential claims of liability.

Finally, if the fill is coming from the enlargement of the East Boat Basin then it will inevitably contain oil and other chemical or petrochemical pollutants, despite the Corps' attempts to insure the fill is clean. These pollutants will do further damage to marine and wildlife in the upper bay, not to mention pose a threat to the many swimmers, sailors, and fishermen along that shore. The public beach at Little Harbor is only a short distance away, and the upper bay and dike are used by hundreds of people daily during the summer. We are concerned enough already about possibly dangerous pollutants coming up the bay from the areas in New Bedford and Fall River determined as hazardous by the EPA. We do not need to add to the problem.

It is tempting to argue that if the fill is coming from Sandwich then it should be dumped somewhere in Sandwich. I realize that may not be possible, but urge you to take every action necessary to prevent the fill from being dumped in Wareham.

Thank you for considering these comments.

Sincerely,

Daniel S. Cheever, Jr.

dsc/mb



TOWN OF WAREHAM

Wareham, Mass. 02571

February 28, 1983

Department of The Army
New England Division Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Attention: Planning Division
Coastal Development Branch

Dear Sirs:

In response to your letter dated February 4, 1983 concerning the expansion of the East Boat Basin in Sandwich, Massachusetts, and the desire to use part of our waters on the back side of Stoney Point Dike as a disposal area for the 500,000 to 1,000,000 cubic yards of material coming from the Sandwich Basin project, the area in question is used in the summer season for a recreational sailboat anchorage for citizens from every town in the area, Falmouth, Pocasset, Bourne, Wareham, Mattapoisett, Marion and Sandwich, just to mention a few, who visit this area all summer to find a sheltered area with deep enough water to accomodate a sailboat.

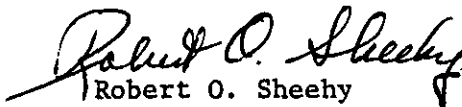
The area in question, in fact, the whole back side of the Stoney Point Dike, is one of the best bay scallop producing areas in the whole town of Wareham. Any change in that area would play a negative role in our shellfish propagation program.


Wareham's Marine Resources Commission and the Shellfish Department oppose any such project using this area as a disposal site for the material coming from the expansion of Sandwich Basin or for any other reason.

It is also our understanding from talking to a Mr. Zwart in Boston, that, if this site was chosen, the material in question would be trucked in, which would mean a lot of wear and tear on our Town roads, which I'm sure will have quite an impact on the Municipal Maintenance Department for repairs to roads caused by this project.

In summary, the Town of Wareham's Marine Resources Commission and the Shellfish Constable of the Town are unalterably opposed to this proposed filling project.

Very truly yours,


Robert O. Sheehy
Shellfish Constable


Dana C. Keyes, Chairman
Marine Resources Commission

ROS:es

cc: file
Board of Selectmen
Town Administrator

March 2, 1983

Planning Division
Coastal Development Branch

Mr. Barry Johnson, Chairman
Board of Selectmen
24 Perry Avenue
Bourne, MA 02532

Gentlemen:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts.

We are presently investigating the viability of alternative disposal sites for the proposed project. Our coordination process has identified a potential upland site in Bourne, located just northwest of the Sagamore Bridge traffic rotary. We have discussed the possible use of this area with Mr. Joe Serenti, and he has indicated that disposal of project material on his portion of the property would be acceptable.

However, the area required to accommodate the 500,000 to 600,000 cubic yards of project material would be much larger, as indicated approximately on the attached map. We understand that the additional area necessary for disposal of the total amount is owned by the town of Bourne. Project material would consist primarily of sand and gravel, with some clay and peat, all of which are chemically clean.

Your comments regarding confirmation of ownership of the previously mentioned property, and the availability and acceptability of this disposal alternative are requested. If at all possible, a timely response would be appreciated so that we may incorporate your views as early as possible in the disposal site selection process.

Your cooperation in this matter is greatly appreciated. Should you have any questions, feel free to contact me at (617) 647-8508. Mr. Dirk Zwart of my staff is coordinating the investigation and can be reached at (617) 647-8553 for additional information.

Sincerely,

Joseph L. Ignazio
Chief, Planning Division

Attachment

cc:
CDB (2) ✓
Plng. Div. Files



TOWN OF WAREHAM

Wareham, Mass. 02571

John F. Healey
Town Administrator

March 2, 1983

Joseph L. Ignazio
Chief, Planning Division
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Dear Mr. Ignazio:

The Town of Wareham Board of Selectmen, Town Administrator, Shellfish Constable, Marine Resources Commission, Conservation Commission and concerned residents vigorously oppose the proposed filling project at Stoney Point Dike. Dumping fill from the East Boat Basin in Sandwich off the Stoney Point Dike will create extensive environmental and other physical damage to the Town of Wareham and abutting property owners.

Rather than detailing our objectives at this time, the Town should be recorded in general opposition. We would appreciate it if you could forward to us any detailed plans and all information on the proposed project as it is developed so that we can keep ourselves informed. Similarly, we must ask you to detail the process that must be followed including any Federal, State or local agency approvals that will be required before the project can be carried out.

Very truly yours,

John F. Healey
Town Administrator

JFH/dg

CC: file
Board of Selectmen

Mr. Zwart
1145

Planning Division
Coastal Development Branch

4 APR 1982

James S. Hoyte, Secretary
Executive Office of Environmental
Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. Hoyte:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts. As part of our normal coordination activities, this office has been in communication with various agencies within the Executive Office of Environmental Affairs regarding selection of a disposal site for dredged and excavated material that would result from the proposed project. Specifically, the following letters are referenced, copies of which are attached:

1. DEQE, Division of Water Pollution Control - October 13, 1982
2. Coastal Zone Management Office - November 5, 1982
3. DEQE, Southeast Region - January 10, 1983

Our regulations require that we select the disposal method of least cost. Our studies have determined that the use of open-water sites within the waters of Cape Cod Bay or Buzzard's Bay would be the least costly disposal means. From the above referenced letters, it is not clear what the position of the Commonwealth of Massachusetts is regarding the permissibility of disposing project material at these sites. The specific sites under consideration are shown on the attached figures. About 500,000 to 600,000 cubic yards of clean, predominantly coarse-grained material would be discharged.

We request that a clarification of the State's position on the use of these sites or any other sites within Cape Cod Bay or Buzzard's Bay be provided to us. In view of the fact that we are required to select a specific disposal site for incorporation into our Draft Stage 3 Report, a timely response would be highly desirable to maintain study progress and responsiveness to the Town of Sandwich. The Town has expressed a desire to see this project go forward.

-2-

We appreciate your cooperation in this matter. Should you have any questions, feel free to call me at 647-8220. Mr. Dirk Zwart of my staff is coordinating this investigation. Should your staff require any further information, he can be reached at 647-8553.

Sincerely,

Carl B. Sciple
Colonel, Corps of Engineers
Division Engineer

Enclosures

cc: Mr. Zwart ✓
CDB
Reading File
Planning Division Files

April 20, 1983

Planning Division
Coastal Development Branch

Mr. Fred Benson
U. S. Fish & Wildlife Service
Ecological Service
P. O. Box 1518
Concord, New Hampshire 03301

Dear Mr. Benson:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts. Reference is made to telephone discussions of 7 April 1983 that Mr. Joe Horowitz of my staff had with Mr. Vern Lang and yourself. Also, reference our previous letter of 4 March 1983 regarding fish and wildlife coordination activities, specifically the scope of work.

This letter transmits information regarding the selected plan of improvement and disposal site to be presented in our draft Feasibility Report, for use in preparation of your Planning Aid Letter. Plan C is the selected plan of improvement, and the Cape Cod Canal disposal site in Cape Cod Bay is the tentatively selected disposal site for Stage III planning purposes. About 535,000 cubic yards of material, comprised of 5.3 percent dredged material and 94.7 percent excavated material, would require disposal. Additional information concerning disposal site selection is enclosed to supplement previously transmitted information, and includes the following:

1. Listing of final array of disposal options.
2. Maps showing disposal site locations.
3. Copies of disposal coordination letters from other agencies and interests.

As discussed with Mr. Horowitz, the target delivery date for your Planning Aid Letter has been revised from 29 April 1983 to 16 May 1983.

Your cooperation in this matter is greatly appreciated. Should you have any questions or require additional information, please contact Mr. Dirk Zwart at (617) 648-6553.

Sincerely,

Joseph L. Ignazio
Chief, Planning Division

Enclosure

cc: Mr. Zwart, Mr. Horowitz, CDB, Planning Div. Files



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. BOX 1518
CONCORD, NEW HAMPSHIRE 03301

Colonel Carl B. Sciple
Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

MAY 11 1983

Dear Colonel Sciple:

This responds to the May 9, 1983, telephone request by Mr. Joe Horowitz of your staff for information on the presence of Federally listed and proposed endangered or threatened species within the disposal area that has been selected for the proposed East Boat Basin project. This disposal area is located at the so-called Boston Foul dumpsite in Massachusetts Bay.

Our review shows that except for occasional transient individuals, no Federally listed or proposed species under our jurisdiction are known to exist in the project impact areas. Therefore, no Biological Assessment or further consultation is required with us under Section 7 of the Endangered Species Act. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to endangered species under our jurisdiction. It does not address other legislation or our concerns under the Fish and Wildlife Coordination Act.

A list of Federally designated endangered and threatened species in Massachusetts is enclosed for your information. Thank you for your cooperation and please contact us if we can be of further assistance.

Sincerely yours,

Gordon E. Beckett
Supervisor,
New England Field Office

Enclosure

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS

Common Name	Scientific Name	Status	Distribution
<u>FISHES:</u>			
Sturgeon, shortnose*	<u>Acipenser brevirostrum</u>	E	Connecticut River and Atlantic Coastal waters
<u>REPTILES:</u>			
Turtle, green*	<u>Chelonia mydas</u>	T	Oceanic straggler in Southern New England
Turtle, hawksbill*	<u>Eretmochelys imbricata</u>	E	Oceanic straggler in Southern New England
Turtle, leatherback*	<u>Dermochelys coriacea</u>	E	Oceanic summer resident
Turtle, loggerhead*	<u>Caretta caretta</u>	T	Oceanic summer resident
Turtle, Atlantic ridley*	<u>Lepidochelys kempii</u>	E	Oceanic summer resident
Turtle, Plymouth red- bellied	<u>Chrysemys rubriventris</u> <u>bangsi</u>	E	Plymouth and Dukes Counties
<u>BIRDS:</u>			
Eagle, bald	<u>Haliaeetus leucocephalus</u>	E	Entire state
Falcon, American peregrine	<u>Falco peregrinus anatum</u>	E	Entire state - re-establishment to former breeding range in progress
Falcon, Arctic peregrine	<u>Falco peregrinus tundrius</u>	E	Entire state Migratory - no nesting
<u>MAMMALS:</u>			
Cougar, eastern	<u>Felis concolor cougar</u>	E	Entire state - may be extinct
Whale, blue*	<u>Balaenoptera musculus</u>	E	Oceanic
Whale, finback*	<u>Balaenoptera physalus</u>	E	Oceanic
Whale, humpback*	<u>Megaptera novaeangliae</u>	E	Oceanic
Whale, right*	<u>Eubalaena</u> spp. (all species)	E	Oceanic
Whale, sei*	<u>Balaenoptera borealis</u>	E	Oceanic
Whale, sperm*	<u>Physeter catodon</u>	E	Oceanic
<u>MOLLUSKS:</u>			
NONE			
<u>PLANTS:</u>			
Small Whorled Pogonia	<u>Isotria meleoloides</u>	E	Hampshire County

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service

Mr. Zwart
CDB

Mr. Wilson/mm/140

May 16, 1983

Planning Division
Impact Analysis Branch

Ms. Valerie A. Talmadge
Executive Director
Massachusetts Historical Commission
294 Washington Street
Boston, Massachusetts 02106

Dear Ms. Talmadge:

As discussed in a telephone conversation (5/11/83) between Mr. John S. Wilson, our Division Archaeologist, and Ms. Simon, of your staff, we enclose a map delineating proposed expansion of the East Boat Basin at the Cape Cod Canal in Sandwich. The boat basin was originally built in the 1930's and expanded to its present dimensions in 1963. Material removed during these activities was deposited in the area between Gallo Road, Service Road, and the railroad bed, the area of currently proposed expansion. The present appearance and elevation of this area indicates that it was probably wetland prior to filling.

As the proposed area of expansion would be limited to removal of this fill and poorly drained soils beneath, it appears unlikely that significant historic or archaeological resources would be affected. Disposal of excavated material would be in the Boston Foul Area, a previously used location where significant historic or archaeological resources are not anticipated.

We would appreciate receiving your comments in a timely manner, for inclusion in our draft feasibility report, which is now in preparation.

Sincerely,

Joseph L. Ignazio
Chief, Planning Division

Enclosure

cc: Mr. Wilson
Mr. Horowitz
Mr. Zwart-CDB ✓
Plng Div File
Reading File



BARRY H. JOHNSON, CHAIRMAN
ROBERT W. PARADY
ROBERT J. KILDUFF

TOWN OF BOURNE

BOARD OF SELECTMEN

24 Perry Avenue
BUZZARDS BAY, MASS. 02532

TEL. 759-4486



May 18, 1983

Mr. Joseph L. Ignazio, Chief
Planning Division
Department of the Army
424 Trapelo Road
Waltham, MA 02254

Re: Proposed Dump Site to Receive Dredged Material
From the East Boat Basin in Sandwich, Mass.

Dear Mr. Ignazio:

Please consider this our response to your letter in which request our comments regarding possible "dump sites" for the above-mentioned job which are located within our town.

We wish to inform you that the land as outlined in your letter has been designated as owned by Mr. Joseph Sorenti.

Regarding the additional parcels which are located behind Mr. Sorenti's land, please be informed that the 1982 town meeting membership voted to authorize the Board of Selectmen to convey same to the North Sagamore Water District for aquifer protection.

It was presented to the town meeting membership that if they voted this authorization, the land in question would remain in its natural state for the previously named purpose.

Therefore, it is our unanimous opinion that these particular parcels should not be used to receive dredged

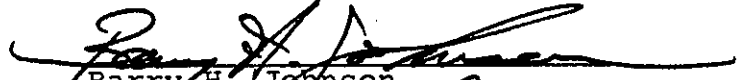


Mr. Joseph L. Ignazio
May 18, 1983
Page 2

material.

If you have any further comments or questions in this matter, please do not hesitate to contact us in this matter.

Sincerely yours,

BOARD OF SELECTMEN


Barry H. Johnson

Robert W. Parady

Robert J. Kilduff

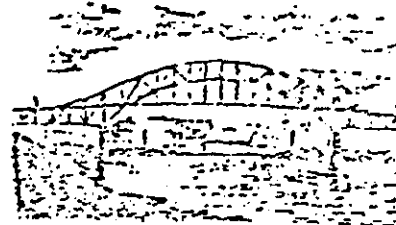
BHJ/njs
cc: Sandwich Board of Selectmen



TOWN OF BOURNE

TOWN CLERK and TREASURER

24 Perry Avenue
Buzzards Bay, MA 02532



Tel 759-4417 or 4415

Mary C. McDonough

April 21, 1983

At the Annual Town Meeting held May 10, 1982, at the Bourne High School, a quorum being present, the warrant having been posted seven days before in the eight post offices and the Bourne Town Hall, the following article was voted on:

ARTICLE 46. To see if the Town will vote to authorize the Board of Selectmen to convey to the North Sagamore Water District five (5) certain parcels of real estate in Bourne (North Sagamore), Barnstable County, being shown on Assessors' Map 6 as Parcels 9, 10, 11, 12 and 22, or act anything thereon. Request of the North Sagamore Water District Commissioners

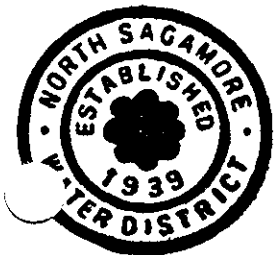
We move that the Town vote to authorize the Board of Selectmen to convey certain parcels of land described in this Article to the North Sagamore Water District for the purpose of providing water resource and watershed protection.

VOTED: Unanimous Vote. Motion Passes

A TRUE COPY ATTEST:

Mary C. McDonough

MARY C. McDONOUGH
TOWN CLERK



NORTH SAGAMORE WATER DISTRICT

P.O. BOX 133, 14 SQUANTO RD.

SAGAMORE BEACH, MA 02562

May 20, 1983

Joseph L. Ignazio, Chief
Planning Division
Department of the Army
424 Trapelo Rd.
Waltham, MA 02254

RE: EAST BOAT BASIN, Sandwich, Mass.
DISPOSAL OF PROJECT MATERIAL

It was the unanimous vote of the Board of Water Commissioners that permission NOT be granted to dump dredged material from the East Boat Basin in Sandwich at the site designated in your letter of May 17th as northwest of the Sagamore Bridge Rotary.

This area is a watershed area for our well near Black Pond and test wells have indicated a potential well site. Any salt in the dredge material would be a probable contaminant to the aquifer.

We feel that this land should remain in its natural state.

A handwritten signature in cursive script, reading "Charlotte L. Stiefel".

Charlotte L. Stiefel
Chairman, Board of Water
Commissioners

copy: Board of Selectmen
Town of Bourne



**MASSACHUSETTS
HISTORICAL
COMMISSION**

**COMMONWEALTH OF MASSACHUSETTS
Office of the Secretary of State**

294 Washington Street
Boston, Massachusetts
02108
617-727-8470

MICHAEL JOSEPH CONNOLLY
Secretary of State

May 20, 1983

Joseph Ignazio, Chief
Planning Division
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, Mass 02254

RE: East Boat Basin, Cape Cod Canal, Sandwich

Dear Mr. Ignazio:

My staff has reviewed the materials received May 19, 1983, which you submitted describing the proposed expansion of the East Boat Basin at the Cape Cod Canal in Sandwich. After review of the material, it has been determined that your proposal will not affect significant cultural, historical, or archaeological resources.

This initial consultation to identify resources in the project area has been undertaken in accordance with 36CFR 800, the Advisory Council Regulations for the Protection of Cultural Resources. Since no significant resources were identified in the vicinity of the proposal, no further compliance with Council Procedures is required.

If you should have any questions, please contact Brona Simon of this office. Thank you for your cooperation.

Sincerely,

Valerie A. Talmage
State Archaeologist
Executive Director
Deputy State Historic Preservation Officer
Massachusetts Historical Commission

xc: John Wilson, ACE

VAT/BS/1k



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. BOX 1518
CONCORD, NEW HAMPSHIRE 03301

Colonel Carl B. Sciple
Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

MAY 25 1983

Dear Colonel Sciple:

This Planning Aid Letter is intended to aid your study planning efforts for development of navigation improvements at East Boat Basin, Sandwich, Massachusetts. It has been prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. et seq.).

We understand that your selected plan, Plan C, would enlarge the existing boat basin by 11 acres (9.1 acres water, 1.9 acres riprap slope) through excavation of adjacent town-owned land. The expansion area would include a channel, turning/maneuvering area, commercial anchorage area, recreational anchorage area, and a fish offloading area. Depths at MLW would range from 14 feet for the channel and maneuvering area to 6 feet for the recreational anchorage area. A sheet steel bulkhead would front the offloading area and riprap would protect the remaining shoreline. Access to this expanded area would be provided by dredging a channel to a depth of 14 feet (MLW) with a width of 140 to 120 feet through the existing boat basin. This project would require the removal and disposal of about 535,000 cubic yards of material, comprised of 5.3 percent dredged material and 94.7 percent excavated material. We understand that the tentatively selected disposal site for this material is the Foul Area in Massachusetts Bay.

Dredging a channel through the existing basin would result in the physical destruction of most of the benthic organisms in the immediate work area. Additional adverse impacts to aquatic organisms would be associated with increased turbidity and sedimentation during the construction period. These adverse impacts are expected to be relatively minor and of short duration. No significant long-term adverse impacts are anticipated from the dredging per se.

Expansion of the basin through excavation would result in the permanent loss of about 11 acres of terrestrial habitat. The area to be excavated is composed largely of fill from construction of the existing basin and nearby powerplant. This area now supports a rather diverse community of grasses, forbs, shrubs and small trees. This habitat can be expected to substantially improve in future years as a result of successional changes. A small wetland area near the center of the site does not hold permanent surface water although at the time of our field inspection (April 21, 1983), it did contain sufficient water to be attractive to waterfowl and shorebirds.

One of the more common shrubs on the area to be excavated is bayberry (Myrica pensylvanica). The fruit of this shrub, in the northeast, is utilized by over 20 species of birds. Tree swallows in particular are partial to bayberry fruit and at times it can constitute up to 30 percent of the birds' diet. ^{1/} Overall, we believe that the area provides habitat of sufficient importance to small mammals and songbirds that its loss would warrant mitigation.

The degree of mitigation that can be achieved is dependent upon selection of a spoil disposal site where habitat can be created or significantly upgraded. We have reviewed your final array of disposal options (letter of April 20, 1983), and conclude that none of the sites afford an opportunity to create or upgrade habitat for mitigation purposes.

The two upland areas, Camp Edwards and the Sagamore Site, both support significant amounts of vegetation that provides habitat for a wide variety of wildlife species. Disposal of spoil at either of these sites would destroy existing vegetation and result in additional habitat losses.

Disposal of the material in open-water areas, such as the Cape Cod Canal Site, Wellfleet Site, and Buzzards Bay Dump Site, could negatively impact fishery resources by smothering planktonic larvae and fouling gills of finfish, lobsters, and other invertebrates. These adverse impacts would be reduced if the material was disposed of at the Boston Foul Area. Although the material in question is relatively clean and suitable for open-water disposal, such disposal would serve no useful purpose except to get rid of the material. It does not afford an opportunity to mitigate habitat losses associated with the East Boat Basin project.

Since your final array of disposal options did not produce an acceptable site for mitigation purposes, we have reevaluated sites that were dropped during previous screening efforts. On-going commercial development rules out the "Stump Dump Site." The large depression to the north of the Sandwich Sanitary Landfill is not acceptable since disposal would entail the loss of additional terrestrial habitat. Creation of a saltmarsh at Stony Point Dike is now ruled out since further investigation has revealed that there is a substantial quahog resource in this area.

In our reevaluation of potential disposal areas, we have found two areas where habitat could be created or upgraded in order to mitigate project-induced habitat losses. One of these areas is the Corps of Engineers' gravel pit at the Canal Midway Station. We realize that this is an active borrow area, however, due to its large size, it may be feasible to rehabilitate habitat on at least a portion of the area. This possibility should receive further investigation.

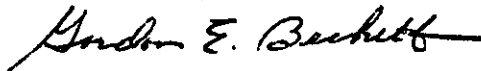
The inactive gravel pit on the Crane Wildlife Management Area probably affords the best opportunity for mitigation of habitat losses. Existing vegetation at this site is very sparse and provides poor wildlife habitat. The Massachusetts Division

^{1/} Martin, Alexander C., Herbert S. Zim and Arnold L. Nelson. 1951. American Wildlife and Plants - A Guide to Wildlife Food Habitats. Dover Publications, Inc. 1961.

of Fisheries and Wildlife does not object to spoil disposal in this area if it would improve existing habitat conditions. The Massachusetts Department of Environmental Quality Engineering (DEQE) eliminated this site from further consideration (letter of January 10, 1983) due to potential chloride contamination of Ashumet Pond. However, further coordination revealed that this Department (DEQE) would not object to disposal of clean excavated material at this site as long as chloride contamination was not a problem. Therefore, we recommend that the material to be excavated be tested for chlorides at surface and at depth and be coordinated with DEQE, MA DF&W, and FWS. We expect that a sufficient amount of material will be found acceptable for disposal at Crane to improve habitat within the gravel pit and thus mitigate habitat losses. If this is the case, then material not approved for disposal at Crane because of high chloride content could be disposed of at the Foul Area.

We strongly prefer that the dredged and excavated material be utilized to mitigate habitat losses or at least be put to some use that would benefit the environment. We will continue coordination with you on this project and to assist in further analysis of potential disposal sites.

Sincerely yours,



Gordon E. Beckett
Supervisor,
New England Field Office



The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

MICHAEL S. DUKAKIS
GOVERNOR

JAMES S. HOYTE
SECRETARY

July 26, 1983

Colonel Carl B. Sciple
NED U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Dear Colonel Sciple:

This letter is in response to your request for clarification of the Commonwealth's position regarding the disposal of excavated material from the Sandwich East Boat Basin project into Cape Cod Bay. The Commonwealth's position regarding the disposal of the Sandwich material in the Bay is as follows:

1. Because of a Massachusetts Environmental Policy Act (MEPA) determination on November 23, 1979 fine grained sediments, silt and clay, may not be disposed of in Cape Cod Bay until a Draft Generic Environmental Impact Report (DGEIR) is submitted to the Secretary of Environmental Affairs.

The DGEIR is ongoing at this time and its development and completion is being coordinated by the Massachusetts Coastal Zone Management (MCZM) Office.

The scope of work for the DGEIR which was issued by MEPA on March 7, 1980 details the data that would be needed to evaluate and or designate one or more fine grain disposal sites in the Bay.

2. Disposal of dredge materials other than fine grain sediments in Cape Cod Bay would not be precluded provided that such disposal is not prohibited by other existing regulatory licenses, permits or statutes including, "State Regulations for Water Quality Certification for Dredging, Dredged Material Disposal and Filling in the Waters of the Commonwealth" (301 CMR 10.00 - 10.32).

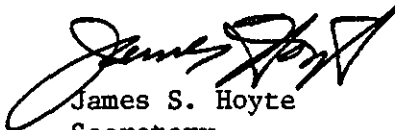
Colonel Carl B. Sciple
July 26, 1983
Page 2

3. The Executive Office of Environmental Affairs (EOEA) continues to recommend that, where feasible, and where grain size is compatible, excavated material from the East Boat Basin project be used to nourish the Sandwich Town Beach (MCZM Policy No. 5). Alternatively, where feasible, the materials should be disposed of at the Boston Foul Area, the upland site at Camp Edwards or used as marsh substrate material in Wareham.

I hope that this clarifies EOEA's position on the disposal of dredged material in Cape Cod Bay and particularly on the disposal of dredged and excavated material from the Sandwich East Boat Basin project.

For any further correspondence on this project, please contact Harriet Diamond of the MCZM Office.

Sincerely,



James S. Hoyte
Secretary

JSH:LVM:bam
attach:

cc: William Needemeyer, U.S. Fish & Wildlife Service
Gene Crouch, U.S. Fish & Wildlife Service
Richard Semonian, NED Corps of Engineers
William Lawless, NED Corps of Engineers
Dirk Zwart, NED Corps of Engineers
Doug Thompson, EPA Region I
Jack Clarke, Cape Cod Planning & Economic Development Commission
Tom McMahon, DEQE, Division of Water Pollution Control
Rich Delaney, Massachusetts Coastal Zone Management Office
Paul Anderson, DEQE, Southeast Regional Office
Chris Mantzaris, National Marine Fisheries Service

NEDPL-C

7 SEP 1983

SUBJECT: East Boat Basin Study

Commander
Headquarters, Camp Edwards
MANG Training Site
Camp Edwards, MA 02542

1. This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts. Reference is made to my previous letter of 20 January 1983 (copy attached) regarding the same subject. A response to that letter has not been received by this office.
2. Mr. Zwart of my staff has discussed the subject several times with LTC Stockhouse, who indicated that disposal of project material at Camp Edwards was a definite possibility. The colonel also stated that material would probably be stockpiled at several locations other than the one shown on the map accompanying my previous letter. A map indicating probable stockpile locations, delineated by Camp Edwards, was to be included with the response to us.
3. It is requested that you provide a timely response so that my staff can fully address the disposal possibilities for this project prior to submission of the report to higher authority, which will occur in the near future. Please inform us of any change in your views regarding this matter; and if you have additional information, it would be appreciated.
4. Should you have any questions, feel free to call me at (617) 647-8220. Mr. Dirk Zwart of my staff is coordinating the investigation and can be reached at (617) 647-8553.

Incl
As stated

CARL B. SCIPLE
Colonel, Corps of Engineers
Commanding

CF:
✓ CDB (2)
Exec. Ofc.
Reading File
Plng. Div. Files

SORENTI BROTHERS, INC.

Maytag Sales and Service — Petroleum Products

TELEPHONE 888-0225 — 888-0137

SAGAMORE ROTARY (Cape Cod), MASS. 02561

MARCH 6, 1984

Department of The Army
New England Division
Corps of Engineers
1424 Trapelo Road
Waltham, Ma. 02254

ATTENTION: Planning Division
Coastal Development Branch

Dear Mr. Ignazio,

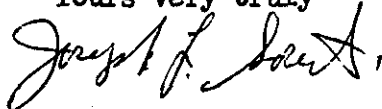
I am writing in reply to your letter of December 15, 1983 concerning the disposal of excavated material from the East Boat Basin in Sandwich to be dumped on our property.

As per my conversation with Mr. Dirk Zwart, I would like you to dump clean fill (not sludge) at the Sagamore Rotary Northwest sight providing that the dumping meets all Town and State regulations.

The sight on the Northeast side of the proposed dumping area was one of the few sights approved by the D.E.Q.E. for the dumping of fill from the Bourne Marina.

If you wish to contact me for any further questions, please feel free to do so at 888-0225.

Yours very truly



Joseph F. Sorenti

JFS:jp



HEADQUARTERS CAMP EDWARDS
MASSACHUSETTS ARMY NATIONAL GUARD TRAINING SITE
CAMP EDWARDS, MA. 02542


MAAR-EDW-FE

20 March 1984

SUBJECT: East Boat Basin

Commander, New England Division Corp Of Engineers
424 Trapelo Road
Waltham, MA 02254

1. Your letter of 20 Jan 1983 with attachments has been reviewed by my Facility Engineer.
2. After careful consideration we do not feel the material proposed for disposal here at Camp Edwards would prove suitable for fill operations in the repair of our existing roads. This would have been the prime consideration for us to accept the product.
3. Camp Edwards also sits astride the main aquifer for the local area, thus evoking a concern for contamination of the local ground water supply.


WAYNE F. WAGNER
COL, EN, MassARNG
Commanding



The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

MICHAEL S. DUKAKIS
GOVERNOR

JAMES S. HOYTE
SECRETARY

June 28, 1984

Colonel Carl B. Sciple
NED U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Colonel Sciple:

This letter is in response to your correspondence of February 29, 1984 regarding the Corps' navigation study for the expansion of the East Boat Basin in Sandwich, Massachusetts. That letter stated that the Corps intended to recommend that the materials generated from that project be disposed at the historical dredged material disposal site located 3.6 nautical miles northeast of the eastern end of the Cape Cod Canal.

In order to refine the position of the Commonwealth on the above referenced disposal location and communicate that position to the Corps, a meeting between the Corps, EPA, and several agencies within the Executive Office of Environmental Affairs (EOEA) was held on April 5, 1984. EOEA agencies which were represented at that meeting were: the Department of Environmental Quality Engineering's (DEQE's), Division of Water Pollution Control and Division of Wetlands; the Department of Fish, Wildlife and Recreational Vehicles' (DFWRVs'), Division of Marine Fisheries; and the Office of Coastal Zone Management. Based on the comments made at that meeting and on the regulations of each agency, the following is a summary of the EOEA position regarding this disposal project.

1. The DEQE-Division of Water Pollution Control

According to Massachusetts Water Pollution Control Regulations, dredged material may only be disposed of on marine sediments of matching grain size (314 CMR 9.00). Based on these regulations and on the information from the Corps that the 30,000 yards of material to be dredged from the harbor are 60% silt and clay, the harbor sediments to be dredged may only be disposed of at either an upland site or, in the ocean, at a fine grained disposal site. In Cape Cod

Bay, this can occur only after the Draft Environmental Impact Report (DEIR) for the designation of a fine grained disposal site in the Bay, which is currently being prepared by the Massachusetts Coastal Zone Management Office, is completed.

The land cut material from the surface down to +10 ft. MLW is classified overall as IA material and as such could be considered for disposal at a sandy ocean site. However, sample data indicates a range of 17 to 60% silt in this material. Using 25% fines for estimating purposes, and based on the expected volume (Corps Plan C), 42,820 cubic yards of fines would be disposed of along with the coarse sediments. Using a similar estimating procedure, the land cut material below +10 MLW contains 83,410 cubic yards of fines. Because of the potential for adverse effects from these fines on nearby shellfish and on the adjacent ecosystem, there are a number of questions which must be answered before DWPC would approve disposal of this land cut material at the proposed "Canal Site".

First, what is the nature of the bottom at the "Canal Site"? The Corps' presumption has been that it is sand; however, the recent experience of Division of Marine Fisheries personnel indicates "rock ledge and boulders" at the site. Are the large rocks the result of the recent disposal of material at the Canal Site or does rock ledge remain there because high current energy scours natural or dumped material from the site? What is the nature of the currents at the site and what will be the effect of currents on the duration and dispersal of the disposed fine grained material? For example, the presence of rock ledge at the site suggests that the sand which the Corps dredged from the Cape Cod Canal and disposed of at the "Canal Site" has been transported away from the site. What was the ultimate fate of this material? Finally, if disposal options are limited for the salt-laden, deeper portions of the land cut, what attempts have been made to reduce the volume of sediments proposed to be disposed of in the Cape Cod Bay?

2. The DEQE-Division of Wetlands and Waterways

First, the Corps' should note that correspondence and reference to dredging activities regulated pursuant to M.G.L. Chapter 131 §40 (the Wetlands Protection Act) and Chapter 91 (Waterways Licensing) should be addressed to the Division of Wetlands and Waterways Regulation (formerly the Division of Wetlands Protection). Both of these regulatory programs are now administered by this Division. A Waterways dredging permit will be required for the East Boat Basin

dredging activities pursuant to M.G.L. Chapter 91 and section 313(a) and 404(e) of the Federal Water Pollution Control Act.

Further, according to the Commonwealth of Massachusetts Wetlands Regulations (310 CMR 10.34), "any project on land containing shellfish shall not adversely affect such land or marine fisheries by a change in the productivity of such land caused by ... alterations in the distribution of sediment grain size ..." Because mapped shellfish beds (ocean quahog) exist at either side of the "Canal Site" and the "Canal Site" is inferred to be an area of high current energy, it is likely that shellfish will experience adverse impacts including the loss of habitat and potential burial due to increased turbidity and sedimentation during disposal and transport of the material from the site after disposal. In the absence of information to the contrary, these impacts would reduce the productivity of land containing shellfish and destroy shellfish habitat, and therefore, under the Wetlands Protection Act, the proposed materials cannot be disposed of at the "Canal Site". As described under the Water Pollution Control Section of this letter, fine grained sediments from the harbor dredging portion of this project could be disposed of at a fine grained site when the DEIR to designate such a site is finalized and if the material meets the conditions at the disposal site. With regard to land disposal, the landcut/excavated materials from this project are composed of a percentage of fine grained materials (16%) which the Division of Wetlands considers too high for disposal on Sandwich Beach. Traditionally, the Division has only approved materials for beach nourishment that have an upper limit of 10% fines. This standard has been used for two reasons: 1) to prevent impacts to resources such as shellfish from high turbidity which would result from the disposal of fine grained material in a high energy area such as a beach (310 CMR 10.27(s)) and, 2) to insure that any material placed on the beach is the same grain size as the material existing on the beach. In summary, the landcut/excavated material is too coarse for marine disposal at the above referenced disposal site to be designated and it also contains a percentage of fines which is too high for beach nourishment. The Division of Wetlands cautions against disposing of salt laden materials at upland sites which have the potential for salt contamination of groundwater. However, in this case, the Division of Wetlands recommends that the Corps' Gravel Pit be considered as a potential upland site for these materials. They have determined that there is a direct transport route for leached salt from this site to the marine waters which keeps it away from groundwater sources.

The DEQE-Division of Solid Waste has authority for the State's determination of: 1) the salt content of the landcut/excavated material, 2) the elevation to which this salt concentration extends, 3) the total volume of the salt laden materials, 4) approval of any upland site for the disposal of the landcut/excavated materials. In order to make this determination, the Division of Solid Waste will require the results of salinity tests on the materials and should be contacted by the Corps prior to the collection of samples for analyses. If the testing shows that the salt content of the landcut materials is low, they may make a site determination for an approved, upland disposal site.

3. The Division of Marine Fisheries (DMF)

DMF has indicated that the "Canal Site" is located between two existing, mapped shellfish beds and a significant lobster population is present at the disposal site. It is the opinion of the Division of Marine Fisheries that, while some lobsters may be buried by disposal, they will likely repopulate at that area and thus, disposal presents no long term significant impact to the lobsters. However, it is also the Division's opinion that, while shellfish are not directly present at the disposal site, they are located on either side of the site, and secondary impacts to those shellfish may occur due to: 1) increased turbidity and sedimentation from disposal and 2) material transport from the site once disposal has occurred. Thus, the Division of Marine Fisheries recommends that none of the material generated from the East Boat Basin project be disposed at the "Canal Site" pending further assessment of the site.

4. The Coastal Zone Management Office

Based upon the Regulations of the above EOE agencies and the existing information concerning the disposal of material from the East Boat Basin project at the "Canal Site," the proposed action is in conflict with Policies of the Massachusetts Coastal Zone Management Program. The MCZM Office is in the process of preparing an EIR for the designation of a disposal site for clean, fine grained dredged sediments (Category Two, Type B according to the state Water Pollution Control Regulations). When the Draft EIR is finalized, the fine grained materials dredged from the harbor could be disposed of at the designated site if they meet the conditions for the use of the site. MCZM recommends that any salt laden materials or landcut materials from the East Boat Basin project be

disposed of at the Corps' "Canal Gravel Pit" which was identified in the Corps' Draft Feasibility Study for the project and which was recommended by the DEQE-Division of Wetlands. MCZM strongly urges the Corps to initiate a marketing study to determine the potential beneficial uses of the excavated materials on uplands. EOEa plans to perform a similar study to determine the potential users of composted sludge generated by the Metropolitan District Commission at the Deer and Nut Island Sewerage facilities. EOEa would be pleased to provide the Corps with a copy of the methodology that will be used as part of our marketing study on the Cape for the East Boat Basin materials. MCZM strongly suggests that the Corps pursue these recommendations with an equal amount of vigor that will be used to investigate the physical and chemical processes at the "Canal Site."

In summary, DEQE-Water Pollution Control prohibits disposal of the East Boat Basin harbor sediments at the "Canal Site" based on grain size incompatibility. A DWPC decision on disposal of land cut materials at the "Canal Site" cannot be made until the above questions on water quality impacts are answered. The DEQE-Division of Wetlands prohibits the disposal of materials at the Canal Site on a presumption of adverse impacts to shellfish pending further information on currents and sediment dispersal, and the Division of Marine Fisheries does not recommend the use of the "Canal Site" for the same reason. The Division of Wetlands Regulations would also prohibit the disposal of the material from this project on Sandwich Beach due to its high percentage of fine grained materials. If the material had a lower fine grained sediment composition, it might have been permitted by the DEQE-Division of Wetlands for beach nourishment. Finally, the DEQE-Division of Wetlands and MCZM recommends that the landcut materials be disposed of at the Corps' gravel pit. MCZM strongly urges the Corps to perform a market analysis to determine any potential beneficial uses of the excavated materials. This is consistent with Policy 5 of the Coastal Zone Management Program which requires a project proponent to evaluate upland disposal locations and beneficial use of dredged and excavated materials. For the East Boat Basin Project, MCZM recommends that the Corps fund oceanographic studies to describe processes at the "Canal Site" only if they provide equally detailed study which evaluates upland uses.

I hope that this letter clarifies the EOEa position regarding the disposal of materials from the East Boat Basin Project. The Massachusetts Coastal Zone Management Office will be evaluating the disposal location of those materials

Colonel Carl B. Sciple

June 28, 1984

Page 6

during its project federal consistency review. I hope that we can resolve this issue and identify a disposal location which is mutually agreeable to both the Corps and my Office prior to that review. For further correspondence on this project, please contact Harriet Diamond of the Coastal Zone Management Staff.

Sincerely,

A handwritten signature in dark ink, appearing to read "James S. Hoyte", written in a cursive style.

James S. Hoyte
Secretary

JSH:sla

TOWN OF SANDWICH

THE OLDEST TOWN ON CAPE COD



P.O. BOX 660
SANDWICH, MASSACHUSETTS 02563
TELEPHONE 888-0187

OFFICE OF THE:
BOARD OF SELECTMEN
BOARD OF ASSESSORS

August 7, 1984

Mr. Dirk Zwart
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Dirk,

We thank you and Dick DeSimone for meeting with us to bring us up-to-date on the status of the Corps study of the East Boat Basin.

Since that meeting we have met with Jack Clark from CZM and Paul Romary, Administrative Assistant to our state representative Tom Lynch. They are assisting us in applying for state grant monies to hire a consultant firm as you suggested.

This firm would help us with such decisions as which of the Corps plans (A, B, C, D) contained in the draft study are best suited for our town; what land-use activities should be allowed; how we implement the final plan, etc.

I will keep you informed as to our progress and success in securing these monies.

Thank you for your continued cooperation.

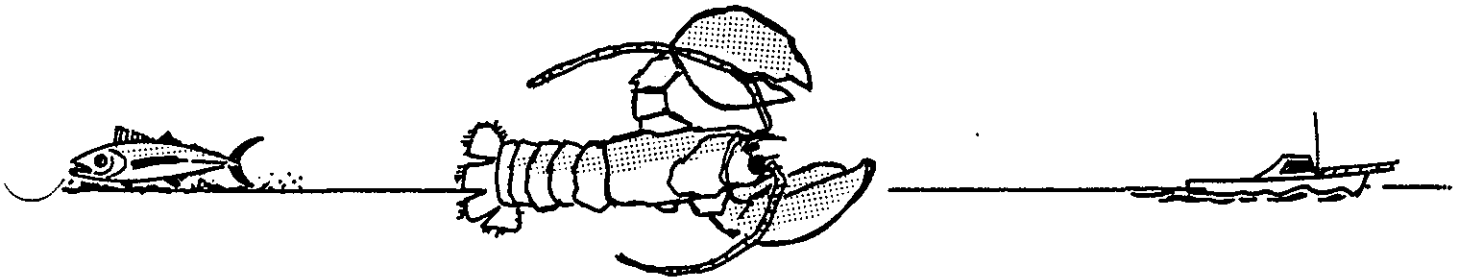
Very truly yours,

BOARD OF SELECTMEN


Joan M. Russell

JMR/jb

cc: Tom Lynch
Jack Clark



LIVING END FISHERIES INC.

Capt. Jim Smith

328-3078

222 HOLBROOK ROAD, QUINCY, MASS. 02171

759-3273

JULY 24, 1980

DIVISION ENGINEER
U.S. CORP. ENGINEERS
N.E. DIVISION
424 TRAPELO RD
WALTHAM, MASS.

DEAR MR. ABCDOWER:

I WOULD LIKE TO RECEIVE A COPY OF THE SURVEY INFORMATION
RECENTLY POSTED AT THE LOCAL POST OFFICE'S TITLED:

"CAPE COD CANAL BOAT BASIN" # NEDPL-C DATED
7/7/80 SANDWICH BOAT BASIN.

I AM INTERESTED IN THIS EXPANSION PROPOSAL AND I WOULD
LIKE TO KEEP-UP TO DATE ON ITS FUTURE.

THANK YOU,

James E. Smith

July 30, 1980

Division Engineer
U. S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

I am writing with regards to the Navigation Study for the Expansion of the East Boat Basin at Sandwich on the Cape Cod Canal.

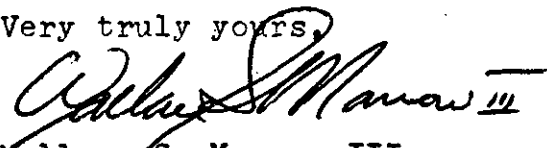
I am a recreational boat owner and have had a boat at the Sandwich Marina for about 12 years now. During this period I have seen the number of pleasure craft, as well as commercial fishing vessels increase many times, with the results of causing gross overcrowding of the facilities to the point of it being unsafe now when trying to approach your slip. On weekends, especially, there are as many as 27 boats anchored in the Harbor of Refuge, and of course, this is stretching the available space beyond its normal accommodations. There are times when the fishing vessels extend out beyond the exit and approach channel for the Coast Guard vessels and cause serious impedance to their safety missions.

The area needs to be expanded to include more facilities for larger craft of both fishing and recreational purposes. Sandwich is a natural jumping off point for boats transiting the Canal and headed to the North. The towns people would greatly benefit from the increased facility.

The anchorage needs to be swept and increased to a minimum of 12 feet. On Saturday, July 26, 1980, the ENCHANTRA, a 67' ketch drawing 19 feet grounded at MLW in the middle of the Harbor of Refuge.

The expansion program is needed desparately both for the safety of existing recreational and fishing vessels, and also for the increase in fishing activity which is necessary to the economic growth of the town.

Very truly yours,


Wallace S. Morrow III
Master, SS OGDEN CHAMPION
Yacht, PHOENIX

**SANDWICH
CAPE COD CANAL
MARINA**

BOX 152 SANDWICH, MASS. 02563
TEL. 888-2500

August 18, 1980

Planning Division
New England Division
Corp. of Army Engineers
424 Trapelo Road
Waltham, Mass. 02254

Re: Permanent and Transient Slips
Sandwich Marina

Length of Slips	out board	in board ^(STERN)	power ^(IN BOARD)	sail	Trns.	Total	Application on file	oldest Date
Boats up to 20'	20	1			1	22	62	May 72
" 20 to 24'	1	4	13	1	3	22	56	Apr. 72
" 25 to 28'			9		1	10	51	June 72
" 29 to 33'			12		2	14	27	May 75
" 34 to 40'			7		5	12	19	Aug 73
" 41 to 43'			4		2	6	12	Aug. 73
" 44 to 50'			4			4	8	June 74
TOTAL	21	5	49	1	14	90	235	

1979 A total of 733 transients used slips some overnight others a week or so.

1980 To date 8/17 537 transients used slips with advance reservations filling all transient slips thru Labor day and some thru Oct. 15.

This past week alone we were unable to accomodate 42 boats that asked for slips without reservations.

The harbor of refuge sometimes fills to capacity with up to 50 boats at anchor. (see photo)

E. T. Moffitt
E. T. Moffitt
Sandwich Harbormaster

cc Selectmen Town of Sandwich



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 102ND FIGHTER INTERCEPTOR WING
MASSACHUSETTS AIR NATIONAL GUARD
OTIS AIR NATIONAL GUARD BASE, MASSACHUSETTS 02542

REPLY TO
ATTN OF: FIW/BCE

APR 6 1982

SUBJECT: East Boat Basin, Sandwich, MA

TO: Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02254
Attn: NEDPL-C

1. Reference your letter dated 26 Mar 82, subject as above.
2. This confirms the telephone conversation between Mr. Zwart of your office and Mr. Merritt of this office to the effect that the Otis sanitary landfill is for the sole use of base occupants and cannot accept excavated and dredged material from subject project.

Philip J. McNamara
PHILIP J. McNAMARA, LtCol, MaANG
Base Civil Engineer

Readiness is our Profession



PHILIP G. COATES
DIRECTOR

The Commonwealth of Massachusetts

Division of Marine Fisheries

Leverett Saltonstall State Office Building

100 Cambridge Street

Boston, Massachusetts 02202

727-3193

April 13, 1983

Dirk Zwart
U.S. Army Corps of Engineers
Coastal Development Rd.
Waltham, MA 02254

Dear Mr. Zwart;

This letter is in response to requests for information for determining the feasibility of Federal participation in the expansion project at the East Boat Basin, Sandwich, Ma.

Background of East Boat Basin

The basin has supported an active commercial fleet, partly described in letters dated August 25, 1980 and November 27, 1981 and in telephone conversations from this agency to the Corps of Engineers.

The basin is a convenient, centrally located, wellprotected deep-water port having ready access to fishing ground in Cape Cod Bay, Massachusetts Bay, Nantucket and Vineyard Sounds, as well as the back side of Cape Cod and Georges Bank. It should be noted that this location allows a "fair-wind" return with a lee provided by the Cape for the last part of the trip from Georges Bank around Race point or through Nantucket Sound during storms with either southeasterly or northeasterly winds. The basin and at least its northeasterly approach are usually icefree and navigable, allowing fishing operations to continue after other near-by ports have frozen to inactivity. The proximity of the Canal Electric Plant offers the potential of utilizing the heated sea water effluent of the plant by diverting all or part into the basin to insure no freeze-overs in even the harshest of winters. There is convenient access to state highways and the Interstate highway system, and there is an existing rail-road siding on an active East coast trunk.

Present East Basin Problems

There are, however, several major problems with the existing port, the most serious being overcrowding and inadequate berthing. The local fishing fleet and the number of transient and seasonal commercial and recreational vessels using the East Basin exceeds

its capacity to a point that presents dangers and debilitating inefficiencies to those vessels.

Commercial vessels of 70' or less (the basin is too small for anything larger) must tie alongside one another out from the existing small pier as many as 15 deep, often damaging one another as they maneuver into or out of this raft or merely move in the wind and swells. When rafted it is very difficult and sometimes almost impossible for any vessel not on the outside of the raft to leave, and then only with the assistance and cooperation of the crews on adjacent vessels. This is a major undertaking which may take an hour or more to accomplish and can be done only when the other vessels are manned. Thus, there are times when a skipper would like to leave the raft to fish, move, offload, take on ice, refuel, make repairs, etc. but either cannot or doesn't bother to. Through talking to fishermen regularly using the basin, I estimate that productive fishing time lost due to rafting-related problems is 20% during spring, summer, and fall. Damage to vessels resulting from rafting is variable, usually contributing more toward lost fishing time.

Rafting presents other hardships to the fishermen. Carrying gear, provisions, or anything across several other boats is difficult. Crossing unfamiliar decks cluttered with fishing gear in darkness or snow and ice is hazardous. Moving almost anything weighing more than about 100 pounds necessitates first moving the boat out of the raft.

But there is no working bulkhead in the basin where a boat can temporarily tie next to a truck for loading or offloading heavy items. There is such a bulkhead on the canal itself but this is fenced off except at the fish packing house for the offloading of fish. Whenever heavy or bulky items must be loaded or off-loaded, either the vessel must go elsewhere or the equipment be man-handled aboard, a very risky and dangerous method. Service vehicles such as welders, mechanics, carpenters, etc. cannot park next to the boat being repaired, making some tasks very difficult, if not impossible. These difficulties often result in the delay of needed maintenance and repair until failure; a dangerous, expensive, and unnecessary procrastination.

Since there is no off-loading alternative, skippers must sell their catch to and take ice from the company holding the exclusive rights to the single off-loading area. This arrangement assures that there is no effective competition for the catch, and no alternative market for the skipper. Furthermore, the skipper must stay on good terms with this company for the privilege of using that area for moving fishing gear on to or off of the boat.

Taking on ice can be done only when there is no vessel off-loading its catch, resulting in a great deal of productive fishing time lost in waiting for ice before the start of a trip. The inefficiencies due to offloading and icing costs 10 to 15% of possible fishing time in summer and contributes to a lower quality (and therefore lesser value) catch.

The one offloading and icing area is located on the canal itself, subjecting the boats to wakes created by vessels transiting the canal. Since many pleasure boats, USCG patrol boats, the Army corps patrol boat, and many freighters create large and powerful wakes, offloading (where heavy masses swing overhead) can become extremely dangerous very suddenly and without warning.

Future growth

Over crowding, inability to handle large fishing vessels, lack of working bulkhead, unloading and icing inefficiencies, and lack of alternative markets for the catch, combine to make the basin less attractive for fishermen presently operating out of other ports. Since other nearby fishing ports such as Scituate, Green Harbor, Plymouth, Provincetown, Woods Hole, and even New Bedford and Gloucester are extremely overcrowded, there is a need from the existing fleet for expanded and improved port facilities. Adequate expansion of the East Boat Basin would attract surplus vessels from these overcrowded ports, helping to alleviate their constipation.

While there will likely be little further expansion in the present groundfish, scallop, and lobster fleets, the opportunities to harvest as-yet underutilized species is real. Substantial markets for herring, mackerel, squid (both *Illex* and *Loligo*) hake (red, white and silver), butterfish, dogfish (both smooth and spiny), and ocean pout are imminent, due to aggressive fisheries development activities by National Marine Fisheries Service, Fisheries Development Foundation, and private groups. Utilization of these untapped seafood resources is important for the growth and health of our fishing industry and, through deficit in our national balance of trade, to the country as a whole.

Due to the lesser value of the underutilized resources, large amounts of these fish must be harvested, handled, and processed in order to make them economically feasible for the harvester and processor. An important but lacking prerequisite is larger and more efficient vessels, offloading systems, processing plants, and berthing-staging areas. As previously mentioned, most Massachusetts fishing ports are already overcrowded and provide for virtually no expansion in the fishing fleet. Furthermore, their facilities are generally obsolete and in need of repair. Expansion of the East Boat Basin would help alleviate overcrowding in several ports, and would provide for imminent growth in the Massachusetts and regional fishing fleet.

Sincerely,



Coordinator, Fisheries
Extension Service

JW/rr

cc: Kevin McKelvey, U.S. Army Corps

NEBFL-C

AUG 10 1982

Ms. Harriet Diamond
Executive Office of
Environmental Affairs
Coastal Zone Management
100 Cambridge Street
Boston, MA 02202

Dear Ms. Diamond:

This letter concerns our ongoing navigation study for expansion of the East Boat Basin in Sandwich, Massachusetts.

We are presently completing intermediate level studies (development of alternative plans) and are initiating the final stage of the study. The final study effort will evaluate four alternative plans of improvement, all of which propose a landcut to expand basin dimensions. A brief description of the proposed alternatives is inclosed.

Environmental studies performed to date have included physical and chemical testing of the material to be disposed of, and the identification of alternative disposal sites. The results of the aforementioned are inclosed for your use.

Based on the test results the material appears to be suitable for both ocean and upland sites. Although an upland site is presently preferred, we feel that all options open to us should remain so. We are therefore requesting assistance in selecting those sites which your office deems acceptable.

Your cooperation in this matter is greatly appreciated. Should you have any questions feel free to contact me at (617) 647-8508. Mr. Dirk Zwart of my staff is coordinating the investigation, with Mr. Joseph Horowitz handling the environmental aspects. Should your staff desire additional information, Mr. Zwart can be reached at (617) 647-8553 and Mr. Horowitz can be reached at (617) 647-8518.

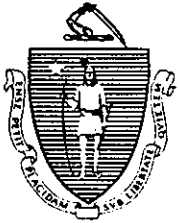
Sincerely, *

Incl
As stated

JOSEPH L. IGNAZIO
Chief, Planning Division

Copy Furnished:
Mr. Jack Clark
Cape Cod Planning &
Economic Development Commission

cc. Coastal Dev. Br.
Mr. Zwart ✓
Mr. Horowitz
Reading File
Planning Div. Files



ANTHONY D. CORTESE Sc. D
Commissioner

PAUL T. ANDERSON
Regional Environmental Engineer

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

Department of Environmental Quality Engineering

Southeast Region

Lakerville Hospital, Lakerville, Massachusetts 02346
947-1231, EXT. 680-684

January 10, 1983

Mr. Joseph Horowitz
Department of the Army
New England Division, C.O.E.
424 Trapelo Road
Waltham, Massachusetts 02254

RE: SANDWICH--NEDPL-C, East Boat Basin

Dear Mr. Horowitz:

As a follow-up to your telephone conversation with Robert Stevens, of the Wetlands Protection staff, we would like to make the following comments on the various options under consideration for the East Boat Basin project. These comments result from project review by members of our Solid Waste and Wetlands Protection staff.

The disposal of marine dredged material presents the major problem to be resolved for the East Boat Basin project. The disposal alternatives are evaluated below in order of acceptability and preferability based on environmental considerations. We have used your numbering and site location descriptions for identification purposes.

#8 C.O.E. - Gravel Pit at the Canal Midway Station - This is the best upland site from a purely environmental perspective because of the proximity of the canal and the local groundwater table gradient. Any chlorides that would be leached out of the marine dredge material would flow directly into the canal, with no possibility of water supply contamination. This site characteristic might also allow recycling of the old fill material which will now be removed to enlarge the basin. If sufficient area is available, then the re-excavated fill could be stockpiled (for several months or longer), to allow rain water to leach out the salts.

#1. Existing Sandwich Sanitary Landfill

#2. Depression to the North of the Sandwich Sanitary Landfill - These sites are both good potential disposal sites. The landfill may be able to handle considerable volumes of material. Due to their location, chloride contamination of public water supplies is not of concern for these sites.

#5. Sandwich Town Beach on the South side of the Cape Cod Canal - If material of compatible grain size distribution is available, then this beach nourishment option should be given highest priority. However, from the data presently available, the sediments may not be appropriate in grain size distribution. Only sample A appears to be even close to compatible and the silt and clay is at a maximum (approximately 16%) for beach nourishment. The high gravel content (approximately 20%) may not be

desirable for recreational purposes. The remaining samples reported show far too much silt and clay to be used for beach nourishment, despite being chemically clean. Additional sampling and size analyses will be needed to properly determine if this option is feasible and, if so, to clearly delineate the extent of appropriate material.

#6. Along the Inland Side of Stony Point Dike in Wareham - This option may be an acceptable alternative, but would require specific approval from the Division of Marine Fisheries before the Department would support it. The implementation of this option must result in beneficial habitat creation to warrant serious consideration.

#3. Valley Along the Eastern Border of Camp Edwards

#4. Stump Dump off Route 130, South of the Sandwich Sanitary Landfill - In our opinion, these two sites are questionable at best. They may be upgradient of the town's gravel packed well and would require considerable additional testing and research to be shown to be sound alternatives. They represent borderline cases of inland disposal sites for marine sediments.

#7. Gravel Pit on the Crane Wildlife Management Area - This site is inappropriate for disposal of marine sediments. It is too far inland and is too close to Ashumet Pond and its associated watershed. The potential for chloride contamination of this fresh water system and nearby wells should eliminate this site from further consideration.

#9. Disposal in '404' Waters - This disposal option may be appropriate, but selection of a specific site and additional testing of the sediments will be required to allow evaluation.

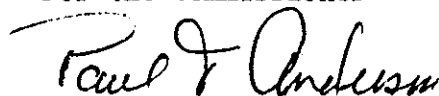
#10. Ocean Disposal - Due to the cost factor imposed by the distance to the Massachusetts Bay Foul Area from Sandwich, this option is probably not feasible. As indicated by you, additional testing would be necessary to complete an environmental review.

With regard to the four basin configuration plans under consideration, the issue of dredge material disposal is the major factor influencing any preference based on environmental concerns. Plan A involves the smallest volume of dredged material (and total volume) and therefore presents the smallest disposal problem of the four options. For this reason, the order of preference for basin plans is A, C, B and D. From a navigational perspective, Plans A and C appear to minimize the potential for mixing of commercial and recreational boat traffic.

Thank you for this opportunity to comment on this project during the planning stages. We hope that our comments will prove helpful in your decision making for the East Boat Basin Project. If you have any questions, please feel free to contact Mr. Robert Stevens at 727-1440, ext. 680.

Very truly yours,

For the Commissioner



Paul T. Anderson, P.E.
Regional Environmental Engineer

Boston University

Center for International Relations
152 Bay State Road
Boston, Massachusetts 02215
617/353-9278



Great Neck Road
Wareham, MA 02571

February 24, 1983

Wareham Board of Selectmen
Town Hall
Wareham, Massachusetts 02571

Dear Selectmen:

I write to oppose and protest the proposal of the Army Corps of Engineers to dispose of material "somewhere behind the Stony Point Dike" to facilitate the expansion of the East Boat Basin in Sandwich. I protest as a life-long summer resident (66 years) of Wareham on Great Neck and as a taxpayer since 1952 (31 years).

The disposal of the fill will add to the already serious silting problem behind the dike which already affects adversely all the residents, year-round and summer, on Great Neck between Tempes Knob and the Stony Point Dike. This area is suitable for recreational sailing, swimming and fishing and commercial shell-fishing. These usages will be harmed by the proposed fill to create a marsh. There is plenty of marshland already in the area of the dike.

Sincerely yours,

Daniel S. Cheever

Daniel S. Cheever
Associate Director

DSC:cc

cc: Mr. Alexander Whiteside
Mr. Charles E. Cheever
Mr. D. S. Cheever, Jr.
Mr. Joseph L. Ignazi
Ms. Judith Montminy
Mr. & Mrs. Colin Canham

RICHARD BANCROFT
WILLIAM B. SLEIGH, JR.
HOWARD S. WHITESIDE
ALLAN R. ROSENBERG
JOHN G. VAN DUSEN
ALEXANDER WHITESIDE

Putnam, Bell & Russell

Attorneys at Law
131 State Street
Boston, Massachusetts 02109-3392
(617) 723-3131

February 24, 1983

Board of Selectmen
Town Hall
Wareham, Mass. 02571

Re: Stony Point Dike

Dear Sirs/Madam:

I own a house and land at the base of the Stony Point Dike on Great Neck. I was born in this house at a time before the dike was built. After its construction in the 1930s, the dike began to spread and also to trap sand driven to shore by the Southwest wind. The result has been a very severe silting problem in our part of the bay extending all the way to the Wareham River. The cove in front of my house now becomes so shallow at low tide that there is barely enough water to swim in. It seems inevitable that if the Corps of Engineers dumps 500,000 to 1,000,000 cubic yards of dredged material in this area, the cove will disappear for all intents and purposes and areas such as Little Harbor and Bourne's Cove will suffer accelerated accretion.

I am writing to urge your opposition to what seems to be totally unnecessary damage to a fairly large part of the town's waterfront. Clearly, no more fill is needed in this area. Many other sections of Massachusetts waterfront, which are suffering severe erosion, would seem to be much more suitable areas for the Corps to dump its dredgings. Indeed, our area of Buzzards Bay should itself be dredged to remove the silting caused by the construction of the dike.

I can see no benefit to the town by compounding what is already a serious problem on a long stretch of the town's shoreline. I also think that trucking the material on Great Neck Road and on the narrow dirt road from the Sacred Heart Seminary to the dike will not only damage the roads but also will endanger the people and animals in the area. The Selectmen should vote that this unwanted fill be kept out of Wareham's water.

Sincerely yours,

Howard S. Whiteside
Howard S. Whiteside

HSW/r

✓cc: Joseph L. Ignazio
Chief, Planning Division, U.S. Army Corps of Engineers

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS

Common Name	Scientific Name	Status	Distribution
<u>FISHES:</u>			
Sturgeon, shortnose*	<u>Acipenser brevirostrum</u>	E	Connecticut River and Atlantic Coastal waters
<u>REPTILES:</u>			
Turtle, green*	<u>Chelonia mydas</u>	T	Oceanic straggler in Southern New England
Turtle, hawksbill*	<u>Eretmochelys imbricata</u>	E	Oceanic straggler in Southern New England
Turtle, leatherback*	<u>Dermochelys coriacea</u>	E	Oceanic summer resident
Turtle, loggerhead*	<u>Caretta caretta</u>	T	Oceanic summer resident
Turtle, Atlantic ridley*	<u>Lepidochelys kempfi</u>	E	Oceanic summer resident
Turtle, Plymouth red- bellied	<u>Chrysemys rubriventris bangsi</u>	E	Plymouth and Dukes Counties
<u>BIRDS:</u>			
Eagle, bald	<u>Haliaeetus leucocephalus</u>	E	Entire state
Falcon, American peregrine	<u>Falco peregrinus anatum</u>	E	Entire state - re-establishment to former breeding range in progress
Falcon, Arctic peregrine	<u>Falco peregrinus tundrius</u>	E	Entire state Migratory - no nesting
<u>MAMMALS:</u>			
Cougar, eastern	<u>Felis concolor cougar</u>	E	Entire state - may be extinct
Whale, blue*	<u>Balaenoptera musculus</u>	E	Oceanic
Whale, finback*	<u>Balaenoptera physalus</u>	E	Oceanic
Whale, humpback*	<u>Megaptera novaeangliae</u>	E	Oceanic
Whale, right*	<u>Eubalaena spp. (all species)</u>	E	Oceanic
Whale, sei*	<u>Balaenoptera borealis</u>	E	Oceanic
Whale, sperm*	<u>Physeter catodon</u>	E	Oceanic
<u>MOLLUSKS:</u>			
NONE			
<u>PLANTS:</u>			
Small Whorled Pogonia	<u>Isotria meleoloides</u>	E	Hampshire County

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service